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ABSTRACT

Developed as a guide for teachers in planning and conducting classes in young or adult farmer education, the 10-lesson unit covers the basic areas of hog production; selection, breeding, feeding, managing, and marketing. The format used is designed to assist teachers in utilizing problem-solving and the discussion method of teaching. The appendix includes teaching forms and a unit evaluation questionnaire. (NJ)

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Profitable Hog Production

An Instructional Unit for Teachers
of Adult Vocational Education in Agriculture

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Lexington, Kentucky

CE 005 282

(VT 102 060)

1973

FOREWORD

Mr. Gary Vincent, teacher of vocational agriculture at Warren East High School, brings to this publication seven years of teaching experience--all of which included working with adult farmers in Bracken, Jessamine and Warren counties. He holds the B.S. degree from Western Kentucky University and the M.S. degree from the University of Kentucky. He has served on the State Advisory Committee for Adult Education in Agriculture and on the State staff as a Supervisor of Adult Agricultural Education Programs.

This adult-farmer course is a result of the following sequence of actions:

1) The State Advisory Committee, made up of agriculture teachers, State staff, and teacher educators throughout Kentucky, was organized to determine needs and program direction for adult work in agriculture for the State. A major outcome of the first meeting in September, 1971, was a recommendation that more instructional materials that are specifically designed for teaching adults in agriculture be developed and distributed to teachers.

2) Subsequently, a proposal to involve experienced teachers of adults in material development was written by Dr. Maynard Iverson of the University of Kentucky and submitted for State funding. In January, 1972, a two-year, special grant was made through the Supporting Services Division, Bureau of Vocational Education, State Department of Education.

3) Twelve teachers were selected to produce units in the diverse areas of need during the course of the project.

This publication, along with other materials developed specifically for instruction of adults employed in agriculture in Kentucky, should improve the teaching of adult classes in agriculture and stimulate the initiation of additional classes.

Robert L. Kelley, Director
Agribusiness Education
State Department of Education

Harold R. Binkley, Chairman
Dept. of Vocational Education
University of Kentucky

ACKNOWLEDGEMENT

We are grateful to the following for their valuable assistance: Dr. James McGuire, Western Kentucky State University, and Dr. Ben Dean, Area Swine Specialist, Cooperative Extension Service, for help in securing references; Mrs. Betty Vincent, Mrs. Anne Mills, and Ms. Linda Ledford for secretarial work on the unit; Mr. Ray Gilmore, artist in the Curriculum Development Center, University of Kentucky, for illustrations used in the unit; Dr. M.D. Whiteker, Professor of Animal Science, and Dr. Frank Pattie, Professor Emeritus, University of Kentucky, for reviewing the manuscripts; Dr. Robert Schneider, Division of Supporting Services, State Department of Education, for expediting financing of the project; and especially to the many writers and organizations whose materials were utilized as references and illustrations in the unit.

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SUGGESTIONS FOR USING THE COURSE

This unit was developed as a guide for use by teachers in planning and conducting young farmer and/or adult farmer classes. Because of the diversity in age, expertise, and experience levels of class members and instructors, the unit was designed to cover the basic areas of hog production. Therefore, teachers should adapt those portions of the unit that are suited to their particular situation. Ten lessons have been included, but the unit may be expanded to more topics or utilized in diversified courses for shorter periods of instruction. It may be helpful to involve class members at the organizational meeting in the selection of lessons and activities. Planning forms to assist in this process are found in the appendix. We highly recommend that teachers planning to utilize this unit secure the following major references: Farm Management (Herbst), Swine Handbook and Swine Information Service Manual (National Hog Farmer Magazine), and Swine Handbook - Housing and Equipment (MWPS-8).

The format used was designed to assist teachers in utilizing problem-solving and the discussion method. A teaching procedure that has been used successfully is as follows: Step 1: The teacher lists the topic (problem and analysis) on the chalkboard. Step 2: He then sets the stage for discussion with introductory facts, ideas, or comments, using items from the section on "developing the situation." Step 3: The teacher calls on the class to give their experience, ideas, and knowledge concerning the subject. The discussion is supplemented with handouts, transparencies, models, or other inputs gathered by the teacher beforehand to help solve the problem under consideration. Resource people or films may also be used here as sources of information. (Transparencies and handout masters are found at the end of each lesson in the unit.) Step 4: When the facts have been brought out and a good discussion has taken place, the teacher leads the group to appropriate conclusions. These summary statements are written on the chalkboard and, in some cases, are typed up and distributed as handouts at the next meeting. Some instructors will utilize devices such as panels, exhibits, and tours to reinforce the conclusions reached. Several suggestions for supplementary enrichment activities are listed in each lesson of this unit.

Teachers may want to utilize the wealth of resources found in each community to supplement their teaching -- local hog farmers, feed company representatives, and others will

undoubtedly be pleased to serve as resource people, furnish samples, give demonstrations, conduct tours, arrange for films and assist with other activities appropriate to the success of the course.

Each teacher using the unit is asked to complete and return the evaluation questionnaire found in the appendix. These ratings and suggestions will be used to improve this unit as well as others developed in the future.

Our best wishes for a successful adult program.

Gary Vincent
Development Consultant

Maynard J. Iverson
Project Director

UNIT OBJECTIVES

Major objective:

To develop the effective ability of Kentucky farmers to produce hogs efficiently.

Lesson objectives:

To develop the effective ability of farmers to:

1. Evaluate hog production as a livestock enterprise.
2. Select a profitable system of hog production.
3. Select and breed hogs efficiently.
4. Feed and manage the swine breeding herd.
5. Feed and manage the sow and litter.
6. Feed and manage hogs from weaning to market.
7. Provide adequate housing.
8. Keep the swine herd healthy.
9. Market hogs efficiently.
10. Keep and use records to improve the hog operation.

UNIT REFERENCES

Books

Doane's Farm Management Guide, (Doane's Agricultural Service, St. Louis, Missouri, 1971).

Farm Management Principles, Budgets, Plans by J. H. Herbst, (Stipes Publishing Co., Champaign, Ill., 1970).

Planning Your Farm Business by J. H. Herbst, (University of Illinois, Champaign-Urbana, Ill.).

Swine Production by Bundy and Diggins, (Prentice-Hall, Englewood Cliffs, New Jersey).

U. S. Government Publications (U. S. Government Printing Office, Washington, D. C.)

Blueprints of Hog Buildings and Equipment, (available from USDA).

Handbook of Agricultural Charts, (USDA).

Kentucky Publications

--Cooperative Extension Publications

Blueprints for Swine Buildings and Equipment, Department of Agricultural Engineering, University of Kentucky.

Feeding and Management of the Swine Breeding Herd, Cir. 598,

Insecticide Recommendations for Swine, 1972.

Kentucky Agricultural Engineer, Department of Agricultural Engineering, University of Kentucky.

Larger Litters Mean More Profits, Leaflet 263.

Pastures for Hogs, Leaflet 312.

Pork Carcass Evaluation, Cir. 614.

Pork Processing on the Farm, Cir. 621.

Selecting Meat-Type Hogs, Leaflet 283.

Swine Feeding and Management from Farrowing to Weaning, Cir. 591.

Swine Feeding and Management from Weaning to Market, Cir. 592.

Swine Production Guide, Misc. 339.

--Kentucky Department of Agriculture Publication

Kentucky Agricultural Statistics, 1972.

--University of Kentucky Department of Animal Science Publications

Feeding and Managing Growing and Finishing Pigs, ASC - 2.

Swine Feed Additives.

Swine: Feeding and Managing Gestating Sows, ASC - 19.

Swine: Feeding and Managing the Sow and Litter, ASC - 1.

Out-of-State Publications

--Iowa State University (Ames, Iowa)

Reproductive Efficiency in Swine, Pm 473-478.

Swine Handbook-Housing and Equipment, MWPS-8, Price is $2.00.

--Kansas State University (Manhattan, Kansas)

Feeding Hogs for Profit, C-333.

Health Handbook for Profitable Swine Production.

Select and Breed Better Hogs, C-332.

--North Dakota State University (Fargo, North Dakota)

Gestation and Lactation Rations for Swine, Cir. A-505.

How Much Should I Pay for Feeder Pigs?, Cir. A-525.

Needle Teeth, Cir. A-375.

--Ohio State University (Columbus, Ohio)

Artificial Insemination of Swine, Cir. 90.

Creep Feeds for Suckling Pigs, Cir. 46.

--Oklahoma State University (Stillwater, Oklahoma)

A Guide to Swine Herd Health, No. 3652.

Feed Management of Growing-Finishing Swine, No. 3654.

Formulating Swine Rations, No. 3501.

Management and Nutrition of the Bred Gilt and Sow, No.,3653.

Managing the Herd Boar, No. 3651.

Managing the Sow and Litter, No. 3650.

--Purdue University (Lafayette, Indiana)

Balancing Swine Rations, AS-326.

Digestion - The Conversion of Feed to Pork, AS-321.

Energy for Swine, AS-345.

Feed Processing for Swine, AS-370.

Freeze Branding - A Method of Identification for Swine, AS-389.

How to Make Backfat Determination, AS-376.

Minerals for Swine, AS-375.

Swine Sanitation, AS-374.

Vitamins for Swine, AS-371.

Water - Its Importance in Swine Nutrition, AS-322.

Wheat for Swine, AS-332.

--South Dakota State University (Brookings, South Dakota)

Swine Producer's Guide, FS-278.

--Texas A & M University (College Station, Texas)

Crossbreeding for Commercial Pork Production, L-728.

Selecting Meatier Hogs, B-922.

--University of Illinois (Urbana, Illinois)

Breeds of Swine, VAS 1045

Caring for the Sow and Litter at Farrowing Time, VAS 1037.

Caring for the Swine Herd During Breeding and Gestation, VAS 1034.

Farrowing Houses for Swine, Cir. 973.

Feeder Pig Production, Cir. 865.

Fitting Livestock to the Farm, VAS 2012a.

Selecting and Purchasing Hogs, VAS 1033.

Swine Feeds and Feeding, VAS 1036.

The Swine Enterprise, VAS 1029.

USDA Grades of Swine, VAS 1048.

Ventilation for Swine, Cir. 862.

What Is the Process of Reproduction?, VAS 1039.

--University of Minnesota (St. Paul, Minnesota)

Genetic Improvement Through Swine Selection, B-353.

Hog Farrowing Houses, M-144.

Housing and Feeding for Gestating Sows, M-143.

--University of Missouri (Columbia, Missouri)

Organizing a Profitable Farm Business.

--University of Nebraska (Lincoln, Nebraska)

Selection and Crossbreeding for the Pork Producer, EC-68-217.

Swine Ration Suggestions, EC-71-210.

--University of Tennessee (Knoxville, Tennessee)

What Sets Hog Prices?, P-473,

Other Publications

Hog Production as section of Advanced Livestock Production, (University of Montana, Columbia, Mo.)

Swine Breed Assocations.

Farm Management Unit, (Successful Farming).

Magazines

National Hog Farmer Series, (bound publication of 190 articles available from Swine Information Service, 1999 Shepard Rd., St. Paul, Minn., 55116, at a cost

of $9.00).

Filmstrips

"Breeds of Swine," (available from Nasco, Fort Atkinson, Kansas).

"Digestion in Swine," (available from Purdue University).

"Pests of Swine," (available from Nasco).

"Producing Meat-Type Hogs," (available from Nasco).

"Selecting Breeding Hogs," (available from Nasco).

"The Brood Sow and Litter," (California State Polytechnic College, San Luis Obispo, Calif).

"USDA Swine and Pork Carcass Grades," (Available from the University of Illinois)

Lesson 1

HOG PRODUCTION AS A LIVESTOCK ENTERPRISE

Objective -- To develop the effective ability of producers to evaluate hog production as a livestock enterprise.

Problem and Analysis --- How should we evaluate hog production as a possible livestock enterprise?

-Trends in hog production
-Characteristics of the swine enterprise
-Factors in determining if hogs should be raised
-Comparison with other livestock enterprises
-Advantages of hog production
-Disadvantages of hog production

Content

I. Trends in Hog Production

A. Hogs are raised to produce pork and to increase farm income.

B. Approximately 70 pounds of pork is consumed per person each year in the U.S.

C. From 85 to 95 million head of hogs are slaughtered annually in the U.S.

D. Kentucky ranks 13th nationally in hog numbers. Kentucky produced 1,734,000 head of hogs in 1970.

E. Hog numbers and value in (this) county.

II. Characteristics of the Swine Enterprise

A. Supply and demand determines the price that farmers receive for pork.

B. The pork producer's cost:

Feed-------65 to 70%
Labor----------10%
Capital----------5%
Equipment---------7%
Other-------3 to 8%

C. Hog production may be characterized by:
1. Good return on feed
2. High labor returns
3. Allowance for range of system
4. Feeds needed are grains and protein
5. Responds to good management

D. Qualities of the pig:
1. Excellent gainers
2. Excellent research animals
3. Very prolific
4. Very efficient
5. Profitable

E. What is needed in pork production:
1. Labor-saving housing and equipment
2. Water supply
3. Feed sources
4. Sound financing
5. Quality hogs
6. Year-round production
7. Disease control
8. Crossbreeding in commercial production
9. Life cycle nutrition

F. Practices that are obsolete in hog production:
1. Feeding gilts like finishing hogs
2. Selecting poor-doing gilts for replacements
3. No identification
4. Using dirt lots
5. Poor fences
6. No vaccination
7. Continuous farrowing
8. Winter farrowing without facilities

III. Factors Determining Whether Hogs Should be Raised

A. Skill and ability of the operator

B. Feed supply

C. Size of farm

D. Labor supply

E. Available markets

F. Capital

G. Facilities and equipment

H. Ability to assume risk

IV. Hog Production in Comparison With Other Livestock Enterprises:

A. Capital requirement
   1. Less in producing hogs than in producing milk
   2. Comparison between hogs and beef varies with type of operation
   3. Capital turnover is faster with hogs than with dairy or beef

B. Labor requirement
   1. Hogs require less than dairy cattle.
   2. Hogs require somewhat more labor than beef cattle.

Labor Requirement for Livestock Enterprises*

Livestock	Unit	Annual hrs. per unit
Dairy (25 cows or more)	1 cow	100
Feeder Cattle (80 hd. or more)	1 feeder	10
Hogs (40 litters or more)	1 litter	20
Beef Cow Herd (calf fed, 40 cows or more)	1 cow	20

* SOURCE: Farm Management Principles, Budgets, Plans, J. H. Herbst, 1970.

C. Management requirements
   1. Producing feeder pigs has a very high managerial requirement.
   2. Producing milk and producing and finishing feeder pigs require high managerial ability.
   3. Finishing feeder pigs and cattle, and raising beef stock cattle have a relatively low managerial requirement.

D. Land requirement
   1. Small and intermediate-sized farms are well adapted to hogs or dairy cattle.
   2. A successful beef operation is best adapted to large farms.

E. Risk involved
   1. High risk projects
      a. Finishing heavy feeder steers
      b. Finishing plain steers
   2. Moderately high risk projects
      a. Finishing medium-weight feeder steers or heifers
      b. Wintering, grazing, and finishing good to choice quality calves
      c. Wintering, grazing, and finishing common to medium quality calves
      d. Wintering stock calves
      e. Finishing feeder pigs
   3. Moderately low risk projects
      a. Wintering and grazing stock calves
   4. Low risk projects
      a. Producing feeder pigs
      b. Producing stock calves
      c. Producing creep-fed calves
      d. Sow and litter operations
      e. Dairy operations

V. Advantages of Hog Production

A. Hogs are efficient consumers of cheap concentrates.

B. Hogs are efficient converters of feed to meat.

C. Home-grown pork is highly nutritious.

D. Labor requirements are lower than for some livestock enterprises.

E. Swine may be raised and finished with a small investment in buildings and equipment.

F. Swine production allows for flexibility.

G. Markets are near production.

H. Hogs provide for a rapid capital turnover.

I. Hogs are excellent in maintaining soil fertility.

VI. Disadvantages of Hog Production

A. Diseases may cause heavy losses in hog production.

B. Producing hogs requires a high managerial ability.

C. Hog prices are not stable.

D. Hogs may be destructive to pasture and equipment.

E. Production costs may be high because of the type of ration required.

F. Odor from a hog operation may be unpleasant.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. The trends in hog production in Kentucky and in the community
2. Characteristics of the swine enterprise
3. What is needed for profitable hog production
4. Comparison with other livestock enterprises

B. Things to be secured from class members:
1. Size and type of hog operations of the enrollees
2. Advantages of hog production
3. Disadvantages of hog production

II. Conclusions

A. Demand for pork products in Kentucky remains strong.

B. With proper management, sound financing, and adequate buildings and facilities we can have a successful hog operation.

C. Hog production compares well, or may even be superior, to other livestock operations.

D. The advantages of hog production seem to outweigh the disadvantages.

III. Enrichment Activities

A. Have class members compile their costs in livestock production and make comparisons.

B. Visit a successful hog operation in the community.

C. List problem areas of class members in hog production, and incorporate problems into units to be taught.

IV. Suggested Teaching Materials

A. References for Lesson 1

1. Farm Management Principles, Budgets, Plans, J.H. Herbst, Chapter 6.
2. Fitting Livestock to the Farm, University of Illinois Publication, VAS 2012a.
3. Kentucky Agricultural Statistics, (Latest edition).
4. 1972 Handbook of Agricultural Charts, USDA Publication, pp. 67, 71.
5. Successful Farming Farm Management Unit, Lesson 8.
6. Swine Production, Bundy and Diggins, 3rd edition, Chapter 1.
7. The Swine Enterprise, University of Illinois Publication, VAS 1029.

B. Audio-visuals

1. Masters*

-1 Meat Consumption per Capita
-2 Rank of States in Hog Production
-3 Changes in Hog Prices and Pork Production
-4 The Pork Producer's Cost
-5 What is Needed in Pork Production
-6 Investment in Livestock, Buildings, Equipment Compared with Annual Value of Production
-7 Choosing Livestock Enterprises that Fit Your Farm
-8 Minutes of Labor to Produce $1.00 Worth of Product

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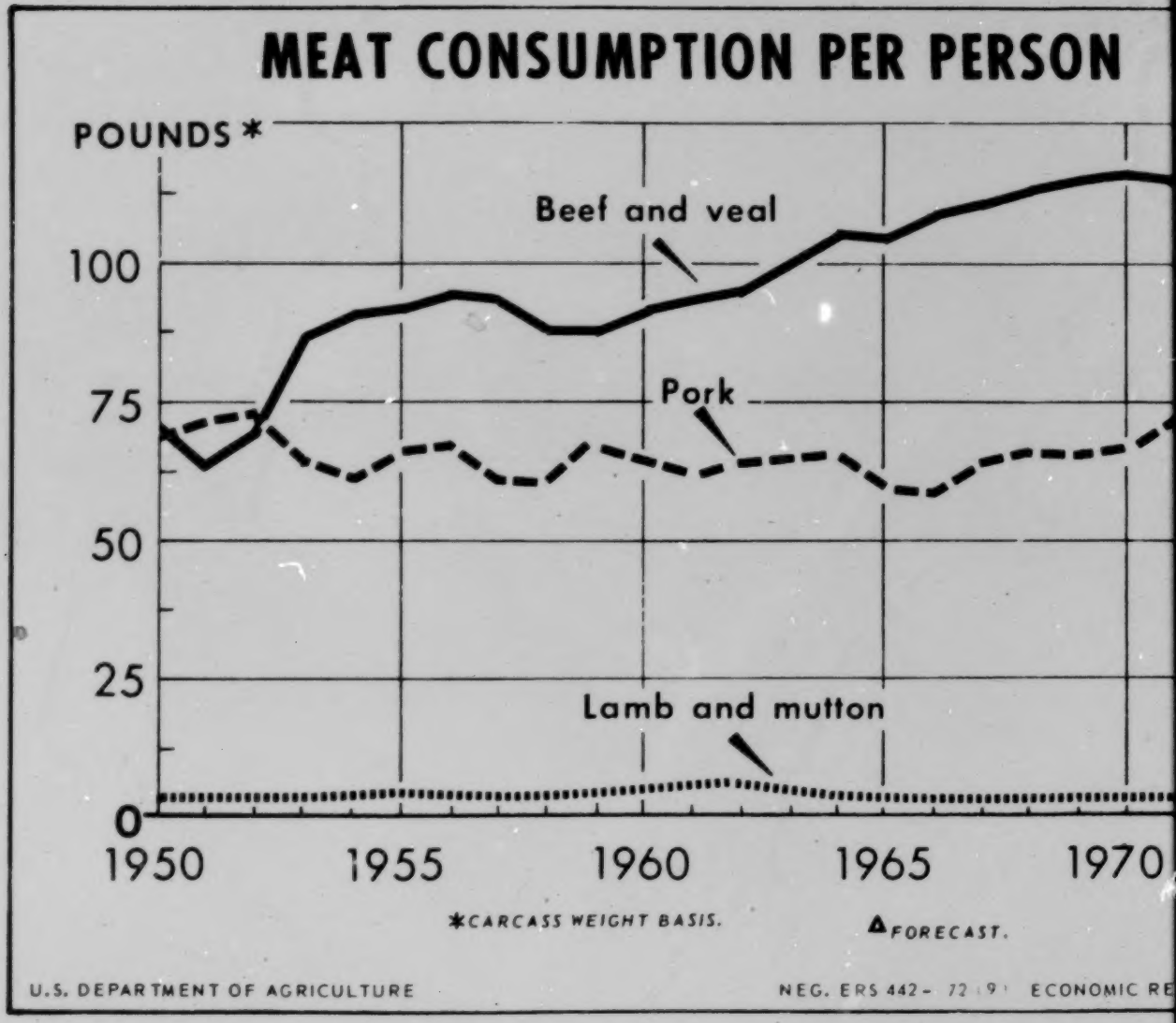
* Masters are keyed to units and lessons, and are numbered consecutively. The code number appears in the lower right hand corner. Master "112-1-1" indicates: adult unit number 112, lesson 1, item 1.


MEAT CONSUMPTION PER PERSON
POUNDS *
100
75
50
25
0
Beef and veal
Pork
Lamb and mutton
1950
1955
1960
1965
1970
*CARCASS WEIGHT BASIS.
Δ FORECAST.
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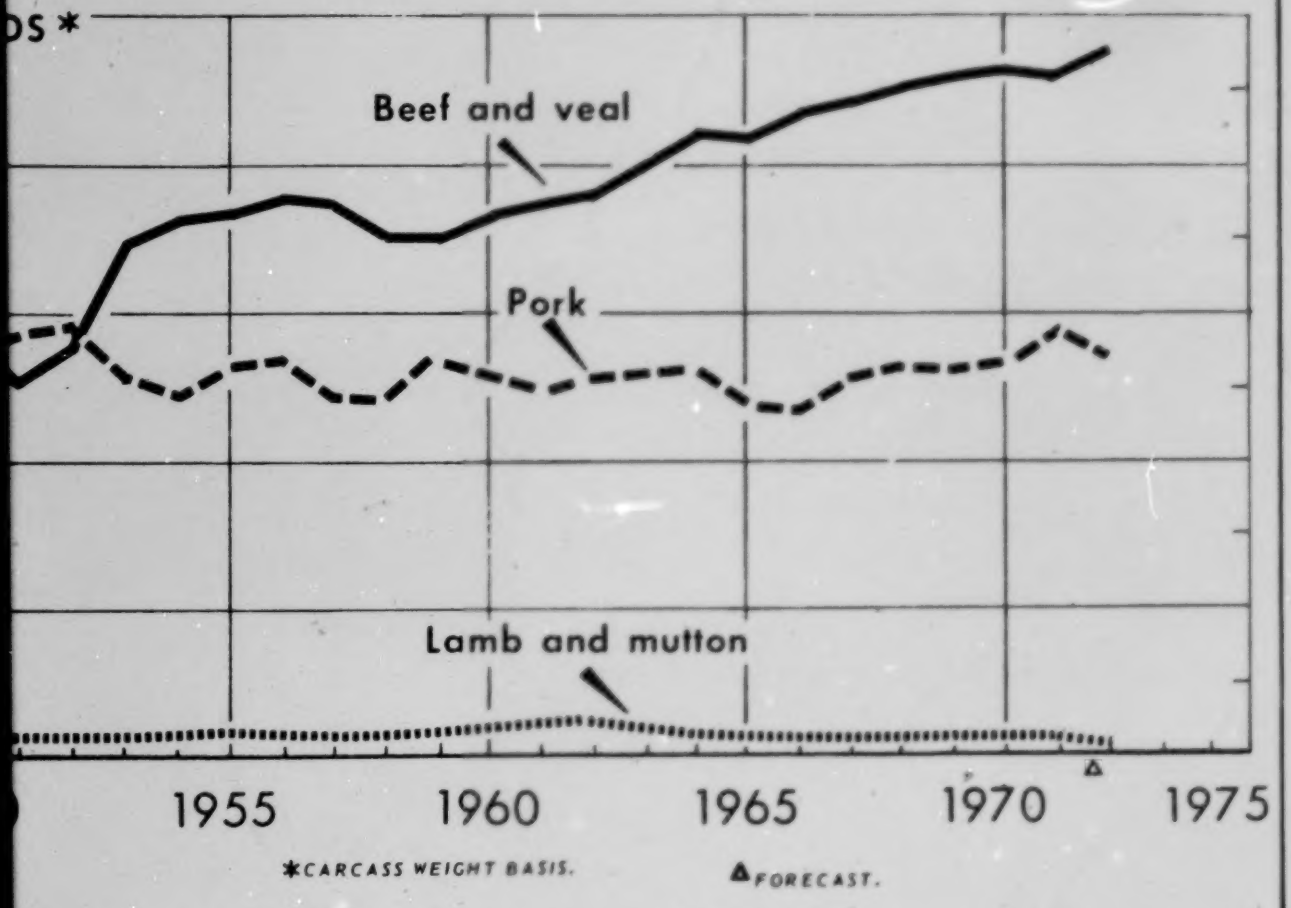
MEAT CONSUMPTION PER PERSON



*CARCASS WEIGHT BASIS.

ΔFORECAST.

T OF AGRICULTURE

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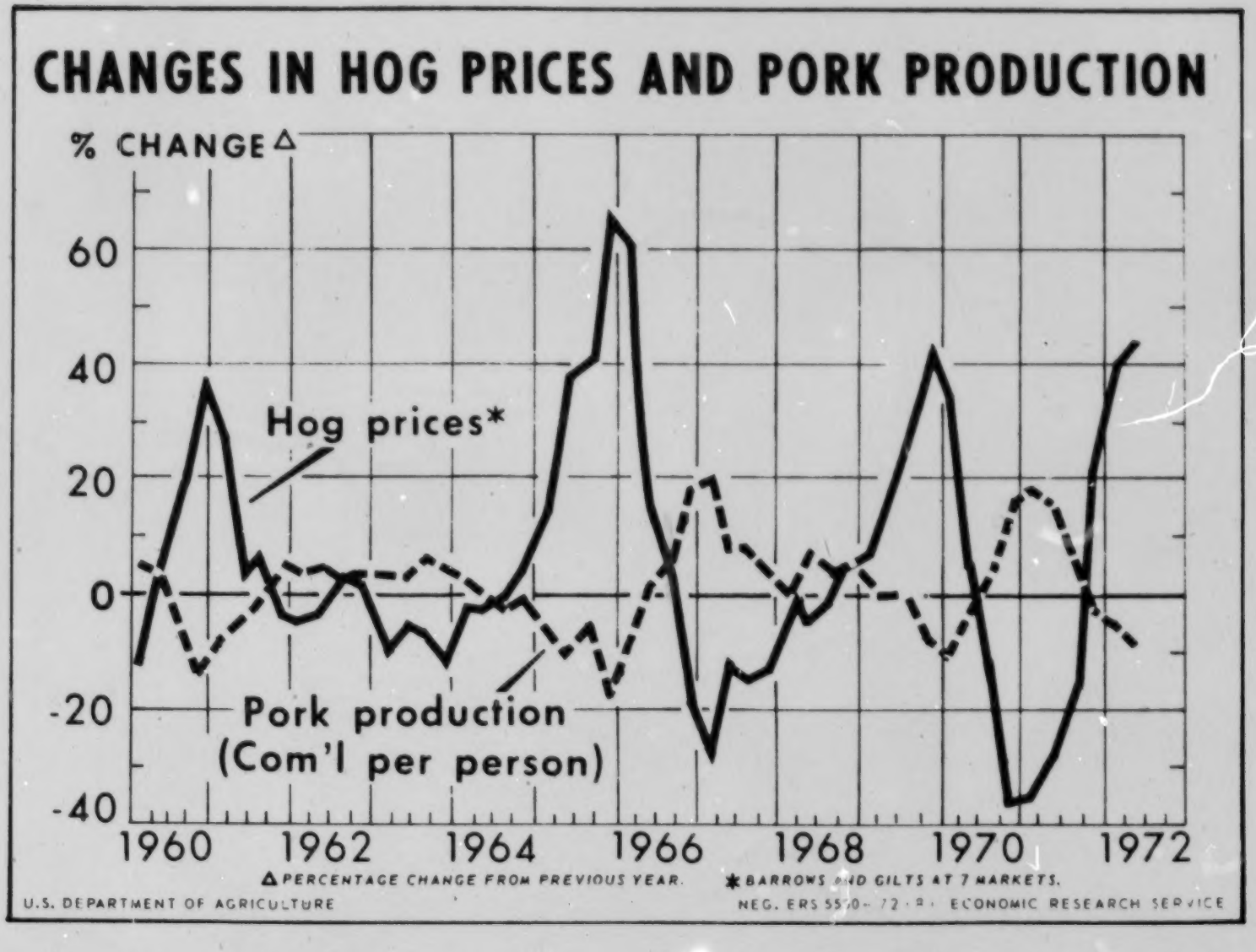
RANK OF STATES IN HOG PRODUCTION

(NUMBER ON FARMS)

1. Iowa
2. Illinois
3. Indiana
4. Missouri
5. Minnesota
6. Nebraska
7. Ohio
8. Kansas
9. Georgia
10. North Carolina
11. South Dakota
12. Wisconsin
13. Kentucky
14. Texas
15. Tennessee
16. Alabama

SOURCE: Kentucky Agricultural Statistics, 1971

112-1-2


CHANGES IN HOG PRICES AND PORK PRODUCTION
% CHANGE Δ
60
40
20
0
-20
-40
Hog prices*
Pork production
(Com'l per person)
1960
1962
1964
1966
1968
1970
1972
Δ PERCENTAGE CHANGE FROM PREVIOUS YEAR.
* BARROWS AND GILTS AT 7 MARKETS.
U.S. DEPARTMENT OF AGRICULTURE
NEG. ERS 5570-72-2 ECONOMIC RESEARCH SERVICE

112-1-3

THE PORK PRODUCER'S COST

FEED	65 to 80%
LABOR	10%
CAPITAL	5%
EQUIPMENT	7%
OTHERS	3 to 8%

112-1-4

[redacted]

WHAT IS NEEDED IN PORK PRODUCTION

1. Water Supply
2. Labor-Saving Housing and Equipment
3. Feed Sources
4. Sound Financing
5. Quality Hogs
6. Year-Round Production
7. Disease Control
8. Crossbreeding in Commercial Production
9. Life Cycle Nutrition

112-1-5

Investment in Livestock, Buildings, and Equipment Compared with Annual Value of Production

Livestock (Units)	Initial Investment Animals	Bldgs. & Equip.	Total	Annual Value of Production	Annual Gross Turnover per $1.00 of Initial Investment[2]
Dairy (1 cow)	385	400	785	420	.50
Beef (1 cow)					
Calf Fed	285	100	385	168	.40
Calf Sold	220	60	280	96	.30
Feeder Cattle, Good-Choice (1 feeder)					
Steer Calf Low Mechanization	122	80	202	117[3]	.60
Yrlg. Steer Low Mech.	163	80	243	118[3]	.50
Hogs (2 litters)					
Confinement	66	500	566	484	.90
Portable Housing	66	200	266	484	1.80
Feeder pigs (1 an.)	13	10	23	42 3/4	1.80

1 Calculations based on figures in AE-4097, University of Illinois, Jan. 1966
2 Rounded figures
3 Cost of livestock deducted
4 Based on two groups per year

Source: Farm Management Principles, Budgets, Plans, J. H. Herbst, 1970

CHOOSING LIVESTOCK ENTERPRISES THAT FIT YOUR FARM

	DAIRY	SHEEP	BEEF COW	BEEF	FEEDER PIG	HOG
Unit	Milk Cow	Ewe	Cow	Cow	Sow	Sow
Production	12,500# Milk	90# Lamb 120% Lamb Crop 8# Wool	450# Calf 90% Calf Crop	950# Beef	14 Pigs 40#	14 Market Hogs
Feed[1]						
Corn	50 bu.	4 bu.	4 bu.	44 bu.	40 bu.	205 bu.
Hay	7200#	800#	4500#	6500#	------	-------
Pasture	1.7 ac.	.26 ac.	1.7 ac.	1.7 ac.	.67 ac.	.67 ac.
Hours Labor	80	4	13	23	15	32
Capital	$1750	$150	$790	$1226	$750	$1500
% Land[2] in						
Corn	15%	9%	2%	14%	37%	75%
Hay	33%	29%	28%	31%	---	---
Pasture	52%	62%	70%	55%	63%	25%
Gross	$575	$25	$110	$195	$227	$500
Net	$172.50	$7.50	$33	$48.75	$56.75	$125
Unit to = $6000 Net	35	800	182	123	106	48

[1]Pasture is alfalfa and grass, untreated permanent pasture would require 3 times as many acres, fertilized and limed pasture permanent 1½ times as many acres.

[2]Yields used were corn 100 bu., hay 3.3 tons, pasture .75 animal units.

Source: Successful Farming Farm Management Unit

112-1-7

MINUTES OF LABOR TO PRODUCE $1.00 WORTH OF PRODUCT WITH VARIOUS LIVESTOCK ENTERPRISES[1]

Livestock Enterprise	Value of Production	Average Labor Requirement	Minutes of Labor per $1.00 of Product
Dairy Cows (25 or more) per cow	420.00	100.0	14
Beef Cows (40 cows or more) Calf fed, per cow	168.00	20.0	7
Calf sold, per cow	96.00	10.0	6
Feeder Cattle (Good-Choice, steer calf, 80 hd. or more) per herd	117.00[2]	10.0	5
Hogs (40 litters or more) per litter	242.00	20.0	5
Feeder Pigs fed (250 pigs or more) per pig	21.00[2]	1.4	4

[1] Source: Farm Management Principles, Budgets, Plans, J. H. Herbst, 1970.

[2] Cost of livestock deducted.

Lesson 2

SELECTING A SYSTEM OF HOG PRODUCTION

Objective -- To develop the effective ability of farmers to select a profitable system of hog production.

Problem and Analysis -- What system of hog production is best suited to our farms?

-Kinds of hog production
-Factors influencing size of operation
-Comparison of systems
-Factors to consider in selecting a system
-Economic considerations

Content

I. Kinds of Hog Production

A. Feeder pig production
1. Demand for 40 to 70 pound pigs is large and should increase with greater specialization.
2. It is possible to have a profitable feeder pig operation on a small farm.
3. A feeder pig operation can be established in a short period of time.
4. Feeder pigs fit well with other livestock enterprises.
5. Feeder pigs are well adapted to most parts of Kentucky because of:
a. Favorable climate
b. Rolling pasture land
c. Closeness to the corn belt
d. Shortage of home-grown grain for finishing hogs
e. Good markets

B. Market hog production
1. Market hog production is well adapted to farms that produce a large amount of grain.

2. Use of good quality, meat-type hogs is essential to success.
3. Market hog production fits well with diversified farming.

C. Producing breeding stock
1. This system is well adapted to small farms and part-time farming.
2. Skill in breeding and a good promotional program are required.
3. It is the most speculative of all types of production.

D. Combination of the systems

II. Factors Influencing the Size of the Operation

A. Level of efficiency

B. Willingness to assume risk

C. Management ability

D. Available capital, labor, management, and equipment

E. Market opportunities

F. Cost structure

III. Comparison of Systems

A. Comparison of finishing hogs with producing feeder pigs:
1. Feed and capital requirement are much higher for producing market hogs than with feeder pigs.
2. Managerial and labor requirements are lower in producing market hogs than with producing feeder pigs.
3. About three times the number of sows can be kept with the same amount of grain in feeder pig production as compared to producing market hogs.

B. Comparison of breeding stock production with feeder pigs:
1. Managerial, feed, labor, and capital require-

ments would be greater with breeding stock than with feeder pig production.
2. The number of sows per man would be less with producing breeding stock than with producing feeder pigs.
3. Increased return on labor and management may be greater in producing breeding stock than with feeder pigs.
4. There would be much more risk involved in producing breeding stock than with feeder pig production.

IV. Factors to Consider in Selecting a System of Hog Production

A. Available resources
1. Land
2. Labor
3. Capital
4. Management
5. Feed supply

B. Resources available versus resources required

C. Income possibilities
1. Factors influencing profits from feeder pig production:
a. Conception rates
b. Number of litters farrowed
c. Pigs weaned per litter
d. Weaning weights
e. Quality of pigs
f. Fixed and variable costs of production
g. Selling price of feeder pigs
2. Factors influencing profits from finishing feeder pigs:
a. Purchase price of feeder pigs
b. Feed prices
c. Feed conversion
d. Hog-corn ratio
e. Rate of gain
f. Death losses
g. Fixed and variable costs of production
h. Carcass quality
i. Selling price of market hogs

D. Manager's preference

E. The system's dependency on:
   1. Producer's available time
   2. Producer's available capital
   3. Producer's ability as a designer and builder
   4. Availability of breeding stock and proven buildings and equipment
   5. Availability of feed
   6. Labor cost

V. Economic Considerations in Selecting a System

A. What would the money invested earn in an alternative enterprise?

B. What are the fixed and variable costs?

C. What are the expected net returns?

D. Will expected profits cover loan payments?

E. How quickly can the investment be recovered in case the operation must be discontinued?

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
   1. Types of hog production found in the community
   2. Characteristics of the various types of production
   3. Opportunities found in the various systems
   4. Comparison of the systems
   5. Determining the size of the operation
   6. Economic considerations in selecting a system

B. Things to secure from class members:
   1. Type of hog production systems of the enrollees
   2. Why enrollees chose this type of system
   3. Comparison of cost structure of the enrollee's systems
   4. Factors to consider in selecting a system of hog production

II. Conclusions

A. The types of hog production are producing feeder pigs, producing market hogs, producing breeding stock, or a combination of these.

B. Feeder pig production is well adapted to most communities in Kentucky because of the climate, closeness to the corn belt, and the shortage of home-grown grain.

C. Market hog production is possible where there is a large amount of grain produced and where quality animals can be secured.

D. Producing breeding stock is well adapted to small farms and require skill in breeding and a good promotional program.

E. The system of hog production will depend largely on the available resources on the farm.

III. Enrichment Activities

A. Have a successful hog producer in each system to discuss their operation with the class.

B. Visit each of these operations.

IV. Suggested Teaching Materials

A. References for Lesson 2

1. Doane's Farm Management Guide, pp. 187-200.
2. Farm Management Principles, Budgets, Plans, J. H. Herbst, Chapter 7.
3. How Much Should I Pay for Feeder Pigs?, Cir. A-525, North Dakota State University.
4. Organizing a Profitable Farm Business, Chapter 3, available from the University of Missouri.
5. Planning Your Farm Business, J. H. Herbst, University of Illinois, pp. 12-15.
6. Units on Hog Production, University of Missouri.

B. Audio-visuals

1. Masters

-1 Swine Enterprise Comparison No. 1
-2 Managerial Requirement for Swine Production
-3 Average Costs and Returns Per Litter For Feeder Pig Production
-4 Factors Favorable and Unfavorable to Producing Purebred Breeding Stock
-5 Swine Enterprise Comparison No. 2
-6 Factors Influencing the Size of Operation
-7 Which System of Hog Production?

SWINE ENTERPRISE COMPARISON #1

ENTERPRISE	NUMBER OF UNITS	RETURN TO LABOR & MGMT.	FEED REQ.	FEED AS % OF TOTAL	TOTAL INVEST.
Producing Feeder Pigs	125 sows	$12,500	$17,625	62%	$52,000
Finishing Feeder Pigs	5000 pigs	$ 5,500	$80,000	75%	$104,000
Producing & Finishing Feeder Pigs	90 sows	$12,500	$36,000	75%	$70,740

Source: University of Missouri Swine Production Unit
"Farm Management Newsletter", November 4, 1968.

112-2-1

MANAGERIAL REQUIREMENTS FOR SWINE PRODUCTION

ENTERPRISE	MANAGERIAL REQUIREMENT	FEED REQUIREMENT	LABOR REQ.	CAPITAL REQ.
Producing Feeder Pigs	Very High	Low	High	Low
Finishing Feeder Pigs	Low	High	Low	High
Producing and Finishing Feeder Pigs	High	Medium	High	Medium

Source: University of Missouri Swine Production Unit, taken from "Farm Management Newsletter", November 4, 1968.

112-2-2

AVERAGE COSTS AND RETURNS PER LITTER
FOR FEEDER PIG PRODUCTION

Level of Production	8 Pigs Raised	
1. Sales	7.5 pigs @ $20.00 per head	$150.00
	.5 Cull sows 200# @ $16.50	33.00
2. Gross Receipts/Sow Unit		$183.00
3. Grain: Corn Equiv. @ $1.15 per bu.	36 bu.	41.40
4. Pasture: Hay Equiv. @ $12.00/ton	.25 ton	3.00
5. Protein, Additives	170# creep feed	10.20
	360# 40% protein	18.00
6. Total Feed Costs		72.60
7. Breeding Charge		1.00
8. Veterinary & Drugs		6.50
9. Feed Processing and Delivery		3.56
10. Electricity		1.75
11. Marketing	Feeder pigs @ $1.50	11.25
	Sows @ $2.70	1.35
12. Misc. @ 1.5% of gross		2.75
13. Total Other Variable Costs		28.16
14. Total All Variable Costs		100.76
15. Income Over Variable Costs		82.24
16. Adjustments to line 15		
Feed Costs: 10% higher	Subtract	7.00
10% lower	Add	7.00
Sale Price: 10% higher	Add	19.00
10% lower	Subtract	19.00

Source: University of Missouri Unit on Hog Production, taken from 1970 Missouri Farm Planning Handbook, pp. 11-40.

112-2-3

FACTORS FAVORABLE AND UNFAVORABLE

TO PRODUCING PUREBRED BREEDING STOCK

FACTORS FAVORABLE

1. Higher Returns per Unit Possible
2. Adapts to Small Farm Operations
3. Adapts to Part-Time Farm Operations

FACTORS UNFAVORABLE

1. More Labor Required per Unit
2. Maximum Management Ability is Required
3. A Promotional Program is Necessary

SOURCE: University of Missouri Unit , Hog Production

112-2-4

SWINE ENTERPRISE COMPARISON #2

Kind of Enterprise	Market Hogs/Litter		Feeder Pigs/Litter		Purebred Stock/Litter	
Level of Production	8 Pigs Raised		8 Pigs Raised		8 Pigs Raised	
1. Sales/Purchases	7.5 market hogs 225# @ $20.00	$337.50	7.5 pigs @ $20.00 per head	$150.00	7.5 head @ 90.00	$675.00
	0.5 Cull Sow 200# @ $16.50	33.00	0.5 Cull Sow 200# @ $16.50	33.00	0.5 Cull Sow 200# @ $16.50	33.00
2. Gross Receipts/Unit		$370.50		$183.00		$708.00
3. Grain: Corn equiv. @ $1.15/bu.	116 bu.	133.40	36bu.	41.40	169 bu.	194.35
4. Pasture: Hay equiv. @ $12.00/ton	0.25 ton	3.00	0.25 ton	3.00	1.3 ton	15.60
5. Protein, salt, minerals, additives	170# creep feed 1000# 40% protein	10.20 50.00	170# creep feed 360# 40% protein	10.20 18.00	190# creep fd. 1466# protein	11.40 73.00
6. Total Feed Cost		196.60		72.60		294.35
7. Breeding Charge		1.00		1.00		25.00
8. Veterinary and drugs		9.00		6.50		25.00
9. Feed Processing & Delivery		11.24		3.56		16.20
10. Electricity		1.75		1.75		1.75
11. Marketing	Barrows & Gilts @ $1.70	12.75	Feeder Pigs @ $1.50	11.25	Registration Boars & Gilts @ $3.00	24.00
	Sows @ $2.70	1.35	Sows @ $2.70	1.35	Sows @ $2.70	1.35
12. Misc. (1.5% gross)		5.56		2.75		10.62
13. Total Other Variable Costs		42.65		28.16		121.42
14. Total All Variable Costs		239.25		100.76		415.77
15. Income Over Variable Costs		131.25		82.24		292.23
16. Adjustments to Line 15:						
Feed Cost: 10% higher	Subtract	20.00	Subtract	7.00	Subtract	29.00
10% lower	Add	20.00	Add	7.00	Add	29.00
Sale Price: 10% higher	Add	37.00	Add	19.00	Add	71.00
10% lower	Subtract	37.00	Subtract	19.00	Subtract	71.00
17. Hours direct labor		16		11		40
18. Animal Investment		$175.00		$98.00		$350.00

Source: University of Missouri Unit on Hog Production, taken from Missouri Farm Planning Handbook, 1971, Tables 10-1 and 10-2.

112-2-5

FACTORS INFLUENCING THE SIZE OF THE OPERATION

1. Level of efficiency

2. Willingness to assume risk

3. Management ability

4. Available capital, labor, management, and equipment

5. Market opportunities

6. Cost structure

112-2-6

WHICH SYSTEM DEPENDS ON:

1. Producer's available time?

2. Producer's available capital?

3. Producer's ability as a designer and builder?

4. Availability of breeding stock?

5. Availability of proven buildings and equipment?

6. Availability of feed?

7. Labor cost?

112-2-7

Lesson 3

SWINE SELECTION AND BREEDING

Objective -- To develop the effective ability of farmers to select and breed hogs efficiently.

Problem and Analysis -- How should we select and breed hogs?

-Selecting a breed of hogs
-Selecting breeding stock
-Physiological factors in swine breeding
-Heritability in swine breeding
-Selecting a method of breeding
-Breeding practices

Content

I. Selecting a Breed of Hogs

A. There are good and poor animals in every breed.

B. The following factors should be considered in selecting a breed:
   1. Mothering ability
   2. Growthiness
   3. Carcass traits
   4. Availability of breeding stock
   5. Personal preference

C. Rank of breeds in mothering ability:
   1. Yorkshire
   2. Landrace
   3. Chester White

D. Rank of breeds in carcass traits:
   1. Hampshire
   2. Poland China

E. Rank of breeds in growthiness:
   1. Duroc

2. Spotted Poland China
3. Yorkshire

F. Hampshires, Yorkshires, and Duroc are most prominent in Kentucky.

II. Selecting Breeding Stock

A. The choice of a breed is not nearly as important as the choice of individuals within the breed.

B. When selecting breeding stock, consider the producing ability of the animal as well as its type.

C. An individual's past production record is the best indication of what to expect for the future.

D. Select animals for meatiness.

E. Reasons for selecting meat-type hogs:
1. Market premium
2. Feed efficiency
3. Faster growth
4. Higher demand

F. Suggested guide for selecting breeding stock:

	Boars	Gilts
Litter size	8 or more	8 or more
Teats on underline	12 or more	12 or more
Feet and legs	Straight, well placed, strong	Straight, well placed, strong
Age at 220 pounds	170 days or less	180 days or less
Pounds of feed per 100 lbs. gain	Less than 300 lbs.	Less than 320 lbs.
Probed backfat at 220 pounds	1.0 in. or less	1.2 in. or less
Carcass length at 220 pounds	29.5 in. or more	29.5 in. or more
Loin-eye area at 220 pounds	4.5 sq. in. or more	4.5 sq. in. or more
Percent lean cuts		
Live weight	36% or more	36% or more
Carcass weight	52% or more	52% or more

G. Additional considerations in selection
1. Free from genetic defects

2. Select gilts from sow litters (They transmit more disease resistance to pigs than do gilts.)
3. Use performance testing if available
4. Require health certificates when purchasing animals
5. Consider raising your own replacement stock

III. Physiological Factors in Swine Breeding

A. Factors influencing litter size
   1. Breeding
   2. Nutrition
   3. Level of feeding
   4. Ovulation rate
   5. Fertilization rate
   6. Embryo survival

B. Factors affecting the number of eggs ovulated
   1. Breed differences
   2. Age of female
   3. Level of nutrition

C. Ovulation rate in swine

	Averages
Number of eggs released from ovary	17
Number of eggs fertilized	16.2
Number of embryos after 25 days	12.3
50 days	11.2
75 days	10.4
100 days	9.8
Number of pigs farrowed alive	9.4
Number of pigs weaned per litter	7.3

SOURCE: Leaflet Pm-478, Iowa State University.

1. Pork producers get to market with about 40% of what they started with.

E. The expected yearly progress made for each selected trait is determined by:

$$\frac{\text{Selection Differential X Heritability}}{\div \text{ Generation Interval}}$$

F. Example of expected improvement in loin-eye using heritability estimate:

Loin-eye of sow herd (average)	3.50 sq. in.
Loin-eye of herd boar (average)	6.50 sq. in.
Difference	3.00 sq. in.

1. 3 sq. in. X ½ (sow's contributed half) X .50 = .75.
2. The average loin-eye of the offspring of such a mating should be 4.15 sq. in.

V. Selecting a Method of Breeding

A. Methods of breeding
   1. Purebred breeding
   2. Upgrading
   3. Crossbreeding
   4. Inbreeding
   5. Artificial insemination

B. Purebred breeding
   1. Essential if selling breeding stock
   2. May not be feasible in commercial production

C. Upgrading
   1. Popular method of breeding
   2. Recommended in commercial production if crossbreeding is not used

D. Crossbreeding
   1. Most popular method of breeding in commercial production
   2. 85 to 90% of market hogs are crossbred
   3. Systems of crossbreeding
      a. Two breed rotational cross (Also called back cross or crisscross method.)
      b. Three breed cross
      c. Three breed rotational cross

d. Multiple cross

4. Three breed rotational cross seems to be the best method.
5. *Hampshires, Yorkshires, and Durocs* make a good combination when using the three breed cross.
6. Improvement over purebreds

Trait	Single Cross	Three way cross
Litter Size	None	12%
Pig Survival	7%	14%
Rate of Gain	14%	14%
Feed Efficiency	None	None
Carcass Meatiness	None	None

7. Crossbreeding will result in:
   a. Larger litters farrowed
   b. Larger litters weaned
   c. Faster growth rate
8. Crossbreeding will not:
   a. Increase feed efficiency.
   b. Increase meatiness
   c. Cover up for poor management

E. Inbreeding
1. Gives disappointing results in most herds because there are too many undesirable characteristics which will be emphasized.
2. Useful tool for exposing carrier animals of both desirable and undesirable recessive genetic characteristics

F. Artificial insemination
1. May be a major system of breeding for swine production in the future
2. It is not recommended at the present time because:
   a. Semen can be preserved for only a few days.
   b. It is difficult to detect heat in gilts and sows.

VI. Breeding Practices

A. Flushing
   1. Flush sows and gilts about 7 to 10 days before breeding by full feeding a high-energy ration.
   2. Discontinue flushing once the animal is bred. Continued flushing after breeding may reduce litter size.
   3. If sows are bred the first heat period after weaning her litter, flushing may not be advisable. Weaning the pigs has a flushing affect.
   4. Flush the boar if he is not in condition for the breeding season.

B. Method of mating
   1. Pasture mating
      a. Less time consuming than hand mating
      b. This system may overwork the boar if several animals come into heat over a short period of time.
      c. Much more difficult for the operator to keep accurate breeding records
      d. It is recommended when using this method that sow herd be divided into groups of 10 to 15 each and boars be rotated from herd to herd or from group to group.
   2. Hand mating
      a. Recommended method of mating
      b. Advantages
         1) Controlled breeding at the desired time
         2) Facilitates better breeding records
         3) Reduces the needed boar power
      c. Disadvantages
         1) More labor
         2) Difficulty in detecting heat periods

C. Additional practices
   1. Semen-test boar or test him on a few market gilts prior to the breeding season.
   2. Do not breed animals when they are sick or have high fever. Fever or sickness in boars may affect sperm production for as much as two to three weeks.
   3. Breed 10% more females than you plan to

farrow.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. Characteristics of the various breeds of hogs
2. Factors in selecting breeding stock
3. Physiological factors in swine breeding
4. Importance of heritability in swine breeding
5. Various methods of breeding

B. Things to be secured from the class members:
1. The breed of hogs that class members prefer
2. What class members look for when selecting breeding stock
3. Problem areas of class members in breeding hogs
4. Method of breeding used in hog production by class members
5. Breeding practices used by class members in hog production

II. Conclusions

A. We should consider mothering ability, growthiness, carcass traits, availability of breeding stock, and personal preference when selecting a breed of hogs.

B. In selecting breeding stock, consider the producing ability of the animal as well as its type. Select animals for meatiness, ones with good production records, and ones with available health certificates.

C. Strive to improve your herd by selecting for those characteristics that have high heritability.

D. A three-breed rotational cross using the Hampshire, Yorkshire, and Duroc breeds seems to be the best method of breeding for most commercial pork producers.

E. Follow proven breeding practices for best efficiency in hog production.

III. Enrichment Activities

A. Show filmstrips found in reference material.

B. Have class members list areas in their hog operation that need improvement. Determine if these can be improved through the breeding program.

C. Visit one of the class member's hog operation with class and demonstrate how to probe for backfat.

IV. Suggested Teaching Materials

A. References for Lesson 3

1. Artificial Insemination in Swine, Ohio State Research Circular 90.
2. Breeds of Swine, University of Illinois VAS 1045.
3. Crossbreeding for Commercial Pork Production, Texas A & M University L-728.
4. Genetic Improvement Through Swine Selection, University of Minnesota Bulletin 353.
5. Larger Litters Mean More Profit, University of Kentucky Leaflet 263.
6. Reproductive Efficiency in Swine, Iowa State University Pm 473-478.
7. Select and Breed Better Hogs, Kansas State University C-332.
8. Selecting and Purchasing Hogs, University of Illinois VAS 1033.
9. Selection and Crossbreeding for the Pork Producer, University of Nebraska EC-68-217.
10. Selecting Meatier Hogs, Texas A & M University B-922.
11. Selecting Meat-Type Hogs, University of Kentucky Leaflet 283.
12. Swine Breed Associations. (See attached list.)
13. Swine Production Guide, University of Kentucky, Misc. 339, pp. 41-45.
14. Swine Production, Bundy and Diggins, 3rd ed., Chapters 2,3, & 5.
15. Units on Hog Production, University of Missouri.
16. What Is the Process of Reproduction?, Univer-

sity of Illinois VAS-1039.

B. Audio-visuals
   1. Masters
      -1 Swine Breeding Associations
      -2 Selection is Key to Hog Breeding
      -3 Time of Breeding, Its Effect on Conception and Litter Size
      -4 Three-Breed Cross
   2. Filmstrips (available from Nasco)
      a. "Producing Meat-Type Hogs"
      b. "Breeds of Swine"
      c. "Selecting Breeding Hogs"

SWINE ASSOCIATIONS

American Berkshire Association
601 W. Monroe Street
Springfield, Illinois 62704

American Landrace Association, Inc.
Box 111 - 112½ N. Main Street
Culver, Indiana 46511

American Yorkshire Club, Inc.
1001 South Street
Lafayette, Indiana 47902

Chester White Swine Record Association
116 E. Eighth Street
Rochester, Indiana 46975

Hampshire Swine Registry
1111 Main Street
Peoria, Illinois 61606

National Spotted Swine Record, Inc.
Bainbridge, Indiana 46105

Poland China Record Association
501 East Losey Street, P. O. Box 71
Galesburg, Illinois 61401

Tamworth Swine Association
R. R. 2
Cedarville, Ohio 45314

United Duroc Swine Registry
237-9 Northeast Monroe Street
Peoria, Illinois 61602

National Hereford Hog Record Association
R. R. 3
Shelbyville, Illinois 62565

Inbred Livestock Registry Association
Route 4, Box 207A
Noblesville, Indiana 46060

112-3-1

SELECTION IS KEY TO HOG BREEDING

	BREEDS							
Pig Traits	**B**	**CW**	**D**	**H**	**L**	**PC**	**SP**	**Y**
Birth Weight	3	4	4	4	3	4	4	2
Pre-Weaning Gain	3	3	4	3	4	3	3	4
Post-Weaning Gain	1	3	4	2	3	3	4	4
Days to reach 200 lbs.	*	165	150	165	160	160	155	155
Feed Efficiency	2	3	5	3	4	3	3	4
Rate of Gain	2	3	5	2	3	3	4	4
Adaptation to Confinement	3	3	3	2	4	3	3	5
Boar Traits								
Soundness on Feet & Legs	4	4	2	2	3	4	3	4
Ruggedness	3	4	4	3	2	3	3	3
Reaction to Stress	3	3	4	2	2	2	4	2
Sow Traits								
Farrowing Ease	4	3	3	3	4	3	3	4
Mothering Ability	3	4	4	2	4	2	3	4
Number Pigs Weaned/Litter	2	3	3	2	4	2	3	4
Carcass Traits								
Backfat Thickness	*	1.35	1.35	1.15	1.35	1.25	1.35	1.35
Carcass Length	A	S	A	A	L	S	A	L
Percent Lean Cuts	1	3	3	5	3	3	3	3
Amount of Muscling	2	3	3	5	2	4	3	3
Crossbreeding								
Best Crossbreeding Use	*	S	B	S	D	S	S	D

For traits with numerical grades: 5-Superior; 4-High; 3-Average; 2-Low; 1-Poor

For Carcass Length: S-Short; A-Average; L-Long

Days to reach 200 pounds is actual days. Backfat thickness is actual inches.

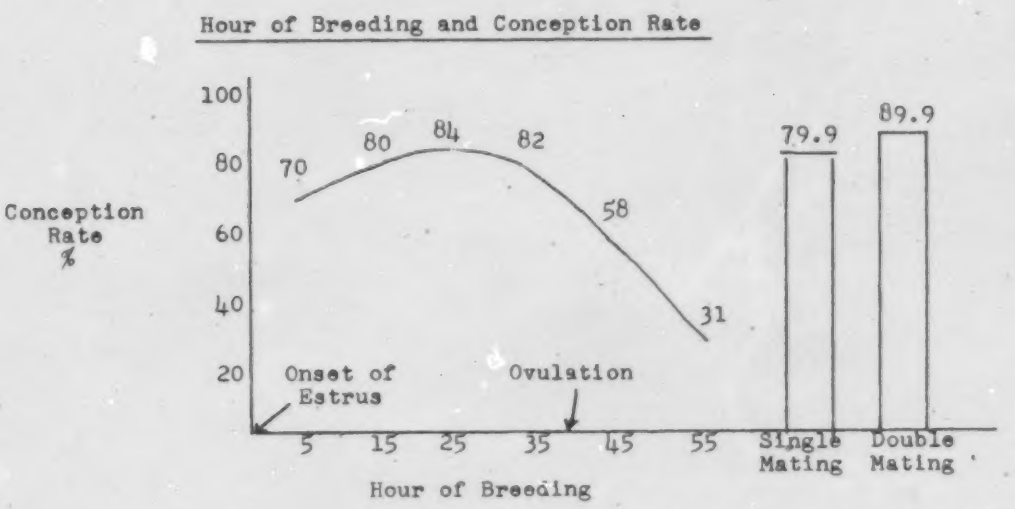
Best Crossbreeding Use: S-Sire; D-Dam; B-Both

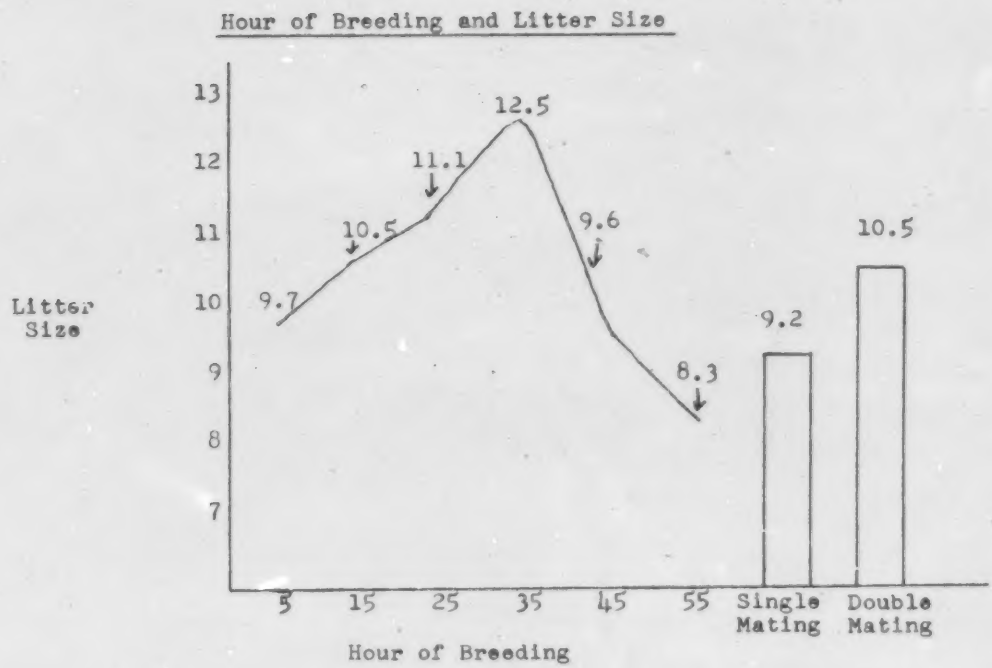
*Data not available

Source: National Livestock Producer, Hog Edition, July,1971.

112-3-2

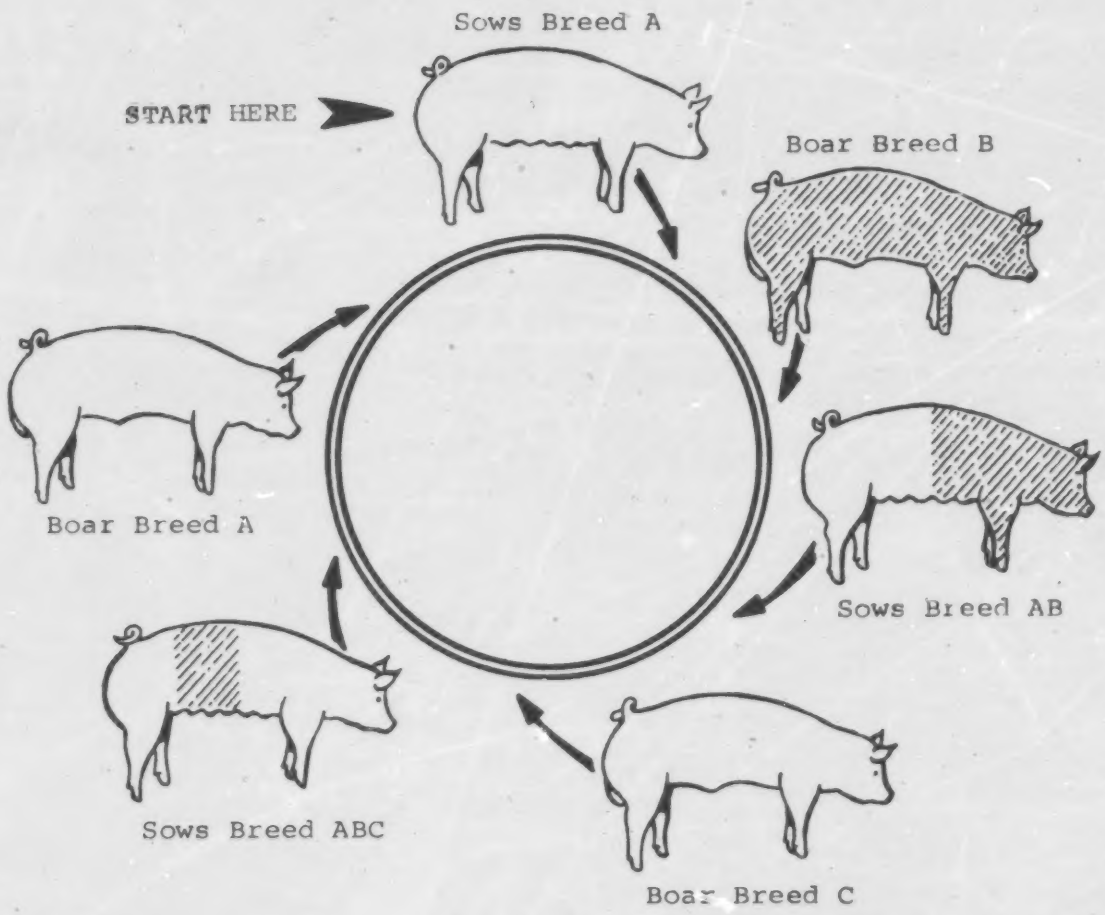
TIME OF BREEDING
--ITS EFFECT ON CONCEPTION AND LITTER SIZE





112-3-3

THREE-BREED CROSS USING PUREBRED BOARS AND CROSSBRED SOWS



SOURCE: "Crossbreeding Programs for Commercial Swine Production" by Ron Edwards (Cooperative Extension Service, University of Kentucky) mimeo.

112-3-4

R GILMORE CURR. DEVE. CNTR UK 1976

Lesson 4

FEEDING AND MANAGEMENT OF THE BREEDING HERD

Objective -- To develop the effective ability of farmers to feed and manage the swine breeding herd.

Problem and Analysis -- How should we feed and manage the swine breeding herd?

-Selecting a farrowing system
-Feeding and management prior to breeding
-Feeding and management at breeding
-Feeding and management during gestation
-Other management practices

Content

I. Selecting a Farrowing System

A. One-litter system
1. Gilts are bred to farrow in the spring or early summer, then are marketed after pigs are weaned.
2. Advantages of the one-litter system:
a. Requires little housing and inexpensive equipment
b. Requires little labor and low managerial ability
c. Sanitation and disease control is easier
d. Avoids winter farrowing
e. Offers tax advantage (capital gains)
3. Disadvantages of the one-litter system:
a. Not conducive to high volume
b. Lower efficiency than other farrowing systems
c. Hogs are marketed when prices are usually low.
4. This system fits well when you want to avoid winter farrowing, are not sufficiently

experienced in raising hogs and are short on labor at farrowing time, or are limited on farrowing facilities.

B. Two-litter system
   1. Farrowing one set of sows two times per year
   2. Advantages of the two-litter system:
      a. If properly timed will produce hogs for highest markets
      b. Does not compete with row crops for labor at farrowing
      c. Produces more pork on given acreage
      d. Uses labor, equipment, buildings more fully
   3. Disadvantages of the two-litter system:
      a. Requires more labor
      b. Requires better buildings and equipment
      c. Higher managerial ability
   4. This system works well when there are adequate farrowing facilities to save pigs in bad weather and the manager is adequately skilled.

C. Multiple farrowing system
   1. Farrowing two litters per year from two or more groups of sows
      a. Two sets of sows farrowing twice per year
      b. Three sets of sows farrowing twice per year, spacing farrowing two months apart
      c. Five-litter system -- Three sets of sows farrow during the winter, then are grouped into two sets for late summer farrowing
   2. Advantages of multiple farrowing:
      a. Large volume production
      b. Makes fuller use of equipment and labor
      c. Spreads marketing over the entire year
      d. Reduces housing and equipment per hog
      e. Makes better use of boar power
   3. Disadvantages of multiple farrowing:
      a. Requires greater managerial skills
      b. Sanitation and disease problems often increased

c. Requires more lots and pens to separate different age hogs
d. Average selling price of hogs may be lower

4. This system works well when you are an above average hog-man, have surplus labor in the off-crop season, have good facilities to handle several different size and age groups of hogs, and have the managerial skill to handle a complex system.

D. Continuous farrowing
1. Raising two litters per year from five or six groups of sows
2. This system is not recommended because it requires almost faultless management.

E. Factors influencing the farrowing system selected:
1. Seasonal labor needs
2. Seasonal price movements
3. Buildings, equipment, and facilities available

II. Feeding and Management Prior to Breeding

A. Determining animals for breeding herd
1. Take advantage of the superior reproductive performance of sows.
a. Sows farrow one or two more pigs per litter than gilts.
b. It takes 12 months to get one litter from gilts--we can get two litters from sows during this time.
c. Gilts need more feed than sows.
2. When selecting gilts for breeding stock, separate them from market hogs no later than when they reach 200 pounds.
3. Sows should be culled if they:
a. Are carriers of some communicable disease.
b. Consistently wean small litters (A gilt should not be culled on the basis of her first litter.).
c. Cannot withstand the stress of confinement.
d. Fail to settle after two or three services.

e. Do not produce pigs that will meet carcass standards.

B. Feeding practices prior to breeding
   1. Consider antibiotic feeding 10 days prior to breeding and two weeks afterwards if breeding problems exist.
   2. Flush animals by full feeding the regular gestating ration about 7 to 10 days prior to breeding (7 or 8 pounds per day should be sufficient for flushing).
   3. Discontinue flushing once an animal is bred.

C. Boar management prior to breeding
   1. Give new boars at least one month rest prior to breeding. This serves as both a quarantine and time for adjustment.
   2. Feed an adequate ration prior to breeding. A boar may become temporarily or permanently sterile if a deficient ration is fed over a period of time.
   3. Avoid using nose rings as they may affect the boar as a breeder.
   4. Remove tusks from boar.

D. Other management practices prior to breeding
   1. Vaccinate the breeding herd for leptospirosis and brucellosis approximately 2 to 3 weeks prior to breeding.
   2. Isolate all newly purchased breeding stock for a period of at least 30 days.

III. Feeding and Management at Breeding

A. Plan breeding schedule for peak markets.

B. Plan for a short breeding season.

C. Observe the herd closely during breeding.

D. Record breeding dates of all females.

E. When using multiple farrowing, rebreed those animals that fail to conceive with next group.

F. Provide shade and sprinklers if necessary to keep boars, gilts, and sows cool during hot weather breeding seasons.

1. High temperatures at the time of breeding appears harmful to conception rate, litter size weaned, and weaning weight
2. Breed in late afternoon during hot weather.

G. Boar management during breeding
1. Give boars room to exercises to keep from becoming sluggish (¼ acre each).
2. Do not pen boars next to sows and gilts coming into heat--the excitement may wear him out.
3. Hand-mate to get maximum benefits from superior boars.
4. Increase boars' feed during the breeding season.
5. Use adequate boar power.

Average Guide for Breeding Boars*

	Hand Mating		Pasture Mating	
Length of Season	Boar Pig	Mature Boar	Boar Pig	Mature Boar
2 weeks	12-15	20-25	8-10	12-15
4 weeks	20-25	30-35	12-15	15-25
6 weeks	25-35	40-45	15-20	25-30
8 weeks	45	45-60	20-25	30-35

6. Feed boars after service rather than before.
7. Keep boars separated.
8. The breeding ability of the boar will be determined by:
   a. Age
   b. Sex drive
   c. Type of mating
   d. General health

IV. Feeding and Management During Gestation

A. Feeding practices
1. Limit-feed the breeding herd to prevent overfatness.
   a. Sows should gain 60 to 70 pounds during gestation.
   b. Gilts should gain no more than 115 pounds during gestation and weigh

* SOURCE: Bulletin C-393, Kansas State University.

approximately 350 to 375 pounds at farrowing.

c. Methods of limit feeding:
   1) Hand-feeding
   2) Self-feeding a high energy ration for 2 to 12 hours out of each 72 hours
   3) Self-feeding a high fiber ration

d. Hand-feeding is recommended because:
   1) Daily observation of the breeding herd
   2) Less feed is used
   3) Boss sows are less of a problem
   4) Best response from controlled feeding

2. The breeding herd seems to do well on a good grass-legume pasture. If these are stock about ten to twelve head per acre.
3. Use sow stalls (7' X 20") when hand-feeding. These will prevent bossy sows from getting too much feed.
4. If automatic watering cups are use, provide one cup for each 12 gilts or 10 sows.
5. When using self-feeders, provide one door for each two head.
6. A high level of antibiotics should be added to the sow's or gilt's ration about two weeks prior to farrowing.

B. Feeding the breeding herd
   1. Feed the breeding herd about a 15% protein ration.
   2. A good gestation ration is as follows:

Ground corn	1538 lbs.
Soybean meal	400 lbs.
Ground limestone	15 lbs.
Dicalcium phosphate	25 lbs.
Iodized salt	10 lbs.
Trace mineral premix	2 lbs.
Vitamin premix	10 lbs.

   3. In dry lots feed about 4 or 5 pounds of a high energy ration per day.
   4. This may need to be increased slightly in cold weather or in feeding gilts (5 or 6 pounds daily).
   5. When animals are on good pasture, this

amount may be cut to about one-half.

6. Gestating animals are capable of utilizing silage or hay, but these are not necessary.
   a. When using silage, feed 9 to 12 lbs. of corn silage, ½ pound of corn and ½ to 1 lb. of a 40% protein supplement.
   b. Good alfalfa or clover hay may make up to 1/3 of the ration.
   c. Gilts will consume less silage and hay than sows and the concentrate ration should be increased slightly.
7. The last third of the gestation might call for some increase in feed if sows and gilts have not gained enough weight.
8. Feed boars the same ration during gestation as sows and gilts (4 to 6 lbs. daily on dry lots.).

V. Other Management Practices

A. Keep bred sows and gilts separate during gestation.

B. Deworm pregnant sows and gilts with piperazine or atgard from 1 to 3 weeks prior to farrowing.

C. Control mange and lice by spraying with Co-Ral or Malathion.

D. Reduce the number of disease-producing organisms by use of disinfectants.

E. Rotate lots and pasture as often as possible.

F. Keep visitors and vehicles out of hog lots.

G. Control rodents and birds.

H. Allow for periodic rest periods of the usable facilities.

I. Prevent severe stress of the breeding herd.

J. Consider using tie stalls (tethers) for gestating animals.
   1. May increase sow's longevity
   2. Reduce activity and injury
   3. Observation of the sow easier

4. Some think it will reduce feed cost
5. Stalls need to be 30 X 72 inches

K. In confinement sows need from 20 to 35 sq. ft. per head.

L. When mating old boars with gilts or young boars with sows, it is recommended that breeding crates be used.

M. Avoid running gestating sows with other classes of livestock.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. Type of farrowing systems and characteristics of each
2. The importance of properly feeding and managing the breeding herd
3. Recommended feeding and management practices in caring for the breeding herd

B. Things to be secured from class members:
1. Type of farrowing systems used by enrollees and their evaluation of them
2. Management practices prior to breeding, at breeding, and during gestation used by class members in their hog operations
3. Feeding practices and rations used by enrollees in their swine operations
4. Problem areas that class members have encountered in this phase of hog production

II. Conclusions

A. The type of farrowing system selected or used will depend largely upon the available labor, facilities, buildings, and equipment as well as the managerial ability of the operator. Multiple farrowing seems to be the trend for the large commercial pork producer.

B. We should determine the desired time of farrowing and plan our breeding season accordingly.

C. Prior to breeding, follow recommended management practices such as culling, flushing, and vaccination for leptospirosis and brucellosis.

D. Good management practices at breeding, such as hand-mating and using adequate "boar power," will contribute to a successful hog operation.

E. For large, strong, healthy litters, we should restrict feed intake, provide adequate buildings and facilities, and control diseases and parasites of the gestating herd.

III. Enrichment Activities

A. From the basis of individual records of the class members, have them determine the animals to cull from their herd.

B. Have class members work out a breeding schedule to coincide with desired farrowing date within their operation.

C. By using the breeding schedule, have enrollees determine the "boar power" needed in their operation.

D. Guide students into compiling rations for their breeding herd.

IV. Suggested Teaching Materials

A. References for Lesson 4

1. Caring for the Swine Herd During Breeding and Gestation, University of Illinois VAS 1034.
2. Feeding and Management of the Swine Breeding Herd, University of Kentucky Cir. 598.
3. Feeding Hogs for Profit, Kansas State University C-333.
4. Gestation and Lactation Rations for Swine, North Dakota State University Cir. A-505.
5. Housing and Feeding for Gestating Sows, University of Minnesota M-143.
6. Management and Nutrition of the Bred Gilt and Sow, Oklahoma State University Publication No. 3653.
7. Managing the Herd Boar, Oklahoma State

University, No. 3651.
8. National Hog Farmer Publications, A-2, A-3, A-25, A-27, A-32, A-36, A-51, B-12.
9. Reproductive Efficiency of Swine, Iowa State University, Pm 474, 475, 477.
10. Swine: Feeding and Managing Gestating Sows, University of Kentucky ASC 19.
11. Swine Production, Bundy and Diggins, Chapter 6.
12. Swine Production Units, University of Missouri.
13. Swine Ration Suggestions, University of Nebraska Bulletin EC-71-210.

B. Audio-visuals
1. Masters
-1 Multiple Farrowing Schedule
-2 The Herd Boar -- The Sex Machine
-3 Ration Formulas for the Swine Breeding Herd

MULTIPLE FARROWING SCHEDULE FOR TWO-SOW FARROWING TWICE A YEAR

SOW SETS	DATES TO BREED	DATES DUE TO FARROW (114 days)	WEANING DATES (42 days)	DATES SOWS ARE REBRED
1	Oct. 10-Nov. 2	Feb. 1-24	Mar. 15-Apr. 7	Apr. 20-May 13
2	Dec. 10-Jan. 2	Apr. 3-26	May 15-June 7	June 10-July 3
1A	Apr. 20-May 13	Aug. 12-Sept. 4	Sept. 23-Oct. 16	Oct. 10-Nov. 2
2A	June 10-July 3	Oct. 2-25	Nov. 13-Dec. 6	Dec. 1-Jan. 2

SOURCE: Leaflet No. 3653, Oklahoma State University.

112-4-1

THE HERD BOAR -- THE SEX MACHINE

How Much Do Boars Ejaculate---------- 250 cc.
or
1/2 Pint
or
50 Billion Sperm Cells

How Much Effect Do Boars Have On Litter Size--Usually None Or No Effect If He Settles The Sow

What Will Keep The Boar From Settling The Sow

1. Sterility
2. Overuse
3. Out of Service Too Long
4. Too Young

112-4-2

RATION FORMULAS FOR THE SWINE BREEDING HERD

	Ration 1	Ration 2
Corn, ground	1616	1581
Soybean meal (49%)	318	187
Meat & bone meal	-	100
Alfalfa meal	-	100
Dicalcium phosphate	34	12
Limestone, ground	18	6
Salt, iodized	10	10
Trace mineral mix	2	2
Vitamin mix	2	2
Total	2000	2000

1. Each of these rations is 15% protein.
2. If 44% soybean meal is used, increase soybean meal level by a factor of 1.15
3. If antibiotics are used during breeding, add 50 gm/ton
4. If antibiotics are fed in late gestation, add 100 gm/ton
5. Feed to boars, replacement gilts, and sows during gestation and lactation. One week prior to and two weeks afterwards, 200 pounds of wheat bran or dried beet pulp per ton should be substituted for corn.

Source: Department of Animal Science, University of Kentucky,

112-4-3

Lesson 5

FEEDING AND MANAGING THE SOW AND LITTER

Objective -- To develop the effective ability of farmers to feed and manage the sow and litter.

Problem and Analysis -- How should we feed and manage the sow and litter?

-Providing a favorable environment
-Preparing the farrowing unit
-Preparing the sow for farrowing
-Care and management at farrowing
-Feeding and management during the suckling period
-Care and management at weaning

Content

I. Providing a Favorable Environment

A. The main purpose of the farrowing unit--whether it is a house, pen, or stall-- is to provide a clean, comfortable environment for the sow and litter.

B. To be comfortable the quarters must:
1. Provide proper ventilation
2. Have adequate warmth
3. Be free from drafts, diseases, parasites, and dust

C. The quarters should also provide protection for the pigs against being crushed. Crushing is a major cause of mortality in pigs.

D. For winter ventilation, 50 cfm (cubic ft./min.) of air should be moved per sow.

E. The temperature of the farrowing unit should be

about 60° F. The temperature in the creep area (where the pigs are) should be 90 to 95° F. Heat lamps may be used in the creep area to provide a favorable temperature.

F. Farrowing stalls should be used to prevent pig crushing. These stalls need to be 22 to 24 inches wide and 6½ to 7 feet long.

G. The unit should be kept dry and free of drafts.

II. Preparing the Farrowing Unit

A. Strict sanitation at farrowing is essential.

B. Thoroughly clean and disinfect the farrowing unit about 2 weeks prior to farrowing.
   1. Use boiling lye water (1 pound to 15 to 20 gallons of water). Apply with a steam cleaner or high-pressure water sprayer.
   2. After cleaning with lye-water, spray unit with a recommended disinfectant and vacate for one to two weeks.

C. One or two days before bringing the sows into the unit, bed lightly with untreated wood shavings, ground straw, or ground corn cobs. Remove these materials and rebed as needed to keep the unit dry.

D. Restrict visitors and other carriers of disease, such as pets and rodents, from entering the unit.

III. Preparing the Sow for Farrowing

A. Wash the sows thoroughly with soap and warm water before placing them into the farrowing unit.

B. Spray the sows with malathion or lindane solution to control lice and mange.

C. Worm sows about two weeks prior to farrowing with dichlorovous (Atgard) or some other good wormer.

D. Move sows into the farrowing quarters about 3 days prior to farrowing (110 days after breeding) so that she will adjust to her new surroundings.

E. Increase the bulk in the sow's ration (wheat bran or dried beet pulp) and provide plenty of clean, fresh water. These practices will aid in controlling fever and in preventing constipation.

F. Hand-feed the sow a few days prior to and after farrowing.

G. The sow will usually farrow within 24 hours after milk appears in the teats.

IV. Care and Management at Farrowing

A. These goals should be set by the manager with his sow and litter:
1. Save 90% of the pigs that are farrowed
2. Pigs weighing 35 pounds at 35 days

B. To accomplish these goals, the following practices should be followed at farrowing:
1. Be present at farrowing.
2. Remove fetal membranes of newborn pigs to prevent suffocation.
3. Dry pigs off to prevent chilling.
4. Clip or break navel cord and disinfect with tincture of iodine or some other good disinfectant.
5. Clip needle teeth with side cutters. Avoid gum injury.
6. Crop tails of pigs if they are to be raised in confinement.
7. Equalize litters.
8. See that pigs nurse as soon as possible.
9. Be sure that the sow has been cleaned--destroy afterbirth by burning or burying.
10. Ear-notch all pigs. (See Lesson 10.)
11. Maintain correct temperature and ventilation.
12. Keep farrowing unit clean and dry.
13. Provide the sow with plenty of clean, warm water.

V. Feeding and Management During the Suckling Period

A. Feeding and management of the sow
1. The sow should be on full feed within a week after farrowing. The beet pulp or

wheat bran should be removed from the ration at this time.

2. The sow should be self-fed a 15 to 16% protein ration. This should be a high-energy ration and contain a high level (100 to 200 gms. per ton) of antibiotics.
3. If the sow is in confinement, exercise her once or twice each day by removing her from the farrowing crate.
4. If sows and litters run together on pasture, the following practices should be observed:
   a. Stock at the rate of 8 sows and litters per acre.
   b. Provide one linear foot or feeder space or one feeder hole for each sow and litter. (The litter should have additional feeder space in the creep.)
   c. Provide one automatic waterer for every 4 sows and litters.
   d. Provide adequate shelter and shade space (50 to 80 sq. ft. per sow and litter).

B. Feeding and management of the litter

1. Prevent anemia by injecting 100 mg. of iron-dextran or iron-dextrin at 3 days of age.
2. If heat lamps are used, gradually toughen the pigs by raising the heat lamp.
3. Castrate all male pigs at 2 weeks of age.
4. Start creep-feeding at 10 days of age.
   a. Feed a 20% crude protein ration that is well fortified with vitamins, minerals, and antibiotics. (See creep rations in masters.)
   b. Replace all the feed in the creep with fresh feed each day until pigs begin to eat.
   c. The maximum number of pigs per linear foot of feeder space should be five.
   d. The edge of the feeder trough should not be more than 4 inches from the floor.
   e. Place creep feeders close to the water supply.
5. Litters should not run together until they are at least two weeks old.

6. Follow good management practices to prevent diseases and parasites. (See Lesson 8.)

VI. Care and Management at Weaning

A. Pigs should be weaned from 4 to 6 weeks of age. Five weeks appears to be ideal. Pigs should weigh 35 pounds at weaning.

B. A highly fortified ration should be provided at weaning.

C. Keep plenty of clean fresh water available.

D. Avoid any unnecessary handling at weaning such as vaccinations, castration, moving, etc.

E. Provide good warm quarters.

F. Do not overload pens.

G. Separate weaned pigs according to age and weight.

H. Prevent stress as much as possible by using good management practices.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. The importance of providing a favorable environment for the sow and litter
2. Characteristics of a desirable farrowing unit
3. Management of the sow prior to farrowing
4. Care and management of the sow and litter at farrowing
5. Feeding and management of the sow and litter during the suckling period
6. Weaning practices to follow for a successful hog operation

B. Things to be secured from the class members:
1. Goals that class members set with their sows and litters
2. Problem areas that the enrollees have

encountered in this phase of hog production
3. Management practices used by class members in caring for the sow and litter
4. Improvements that the enrollees plan to make in their operation as a result of this lesson

II. Conclusions

A. A well-ventilated, warm, dry, draft- and disease-free environment is essential if large litters of healthy pigs are to be weaned.

B. The farrowing unit must be sanitary and comfortable for best results with the sow and litter.

C. Using recommended management practices prior to and during farrowing will help in reaching the goal of saving 90% of the pigs that are farrowed.

D. Feeding and management during the suckling period are of utmost importance if we are to have 35-pound pigs at 35 days of age.

E. For best results, we should wean our pigs at about five weeks of age and follow good management practices to insure that they will be efficient in the feed lot.

III. Enrichment Activities

A. Show and discuss the filmstrip "The Brood Sow and Litter."

B. Guide class members into compiling creep fed rations for their operation.

C. Visit a successful farrowing operation in the community.

IV. Suggested Teaching Material

A. References for Lesson 5
1. Caring for the Sow and Litter at Farrowing Time, University of Illinois VAS 1037.
2. Creep Feeds for Suckling Pigs, Ohio State University Cir. 46.

3. Feeder Pig Production in Illinois, University of Illinois Cir. 865.
4. Feeding and Managing the Swine Breeding Herd, University of Kentucky Cir. 598.
5. Gestation and Lactations for Swine, North Dakota State University Cir. A-505.
6. Managing the Sow and Litter, Oklahoma State University Leaflet No. 3650.
7. National Hog Farmer Publications, A-1, A-41, A-42, A-46, E-2.
8. Needle Teeth, North Dakota State University Cir. A-375.
9. Reproductive Efficiency in Swine, Iowa State University Pm-474 & 475.
10. Swine Feeding and Management from Farrowing to Weaning, University of Kentucky Cir. 591.
11. Swine Producer's Guide, South Dakota State University FS 278.
12. Swine Production, Bundy and Diggins, Chapter 7.
13. Swine Production Guide, University of Kentucky Misc. 339.
14. Swine Sanitation, Purdue University AS-324.

B. Audio-visuals
   1. Masters
      -1 Effect of Litter Size on Costs per Pig
      -2 Managing the Sow and Litter
      -3 Starter Diets
   2. Filmstrip
      "The Brood Sow and Litter" (available from California State Polytechnic College, San Luis Obispo, Calif.)

EFFECT OF LITTER SIZE ON COSTS PER PIG[1]

Pigs weaned per litter	Total Cost per litter	Total Cost per pig weaned
12	$ 77.00	$ 6.40
10	70.87	7.09
8	66.07	8.26
6	61.27	10.21
4	56.47	14.10
2	41.67	20.84

1 The data is based on the assumption that feed costs represent 75 percent of all costs. Grain is valued at 2 cents per pound, supplement at 5 cents per pound, and creep feed at 6 cents per pound.

Source: University of Illinois, Circular 865.

112-5-1

MANAGING THE SOW AND LITTER

1. Have farrowing quarters thoroughly cleaned and disinfected prior to moving in the sow.
2. Use farrowing crates or stalls to reduce pig losses. Stalls should be 6 ½ - 7 feet long and 22 - 24 inches wide.
3. Bring sows in 2 - 5 days prior to farrowing and thoroughly wash the sow and spray for lice and mange before putting her in the farrowing stall.
4. Provide the sow with clean fresh water at all times.
5. Hand-feed the sow a few days prior to and after farrowing.
6. After farrowing bring the sow up to a full feed as soon as possible. The ration should contain 15 - 16% crude protein and should carry a high level of antibiotics.
7. The temperature of the farrowing barn should be maintained at 55 to 60 degrees F.
8. The temperature in the creep area should be maintained at 90 to 95 degrees F.
9. For winter ventilation, 50 cfm of air should be moved per sow.
10. Equalize litters by transferring pigs within 24 hours after farrowing.
11. Ear-notch pigs so they will be identified for record keeping purposes.
12. Clip needle teeth, do not injure gums.
13. Treat navel cord at birth with tincture of iodine or some other suitable product.
14. Treat pigs to prevent anemia using a 100 mg. injection of iron dextran or iron dextrin at 1 to 3 days of age.
15. Start creep-feeding pigs at 2 weeks of age. The ration should contain 18 - 20% crude protein and be well fortified with minerals, vitamins, and antibiotics.
16. Castrate pigs at two weeks of age or less.
17. Crop the tails of pigs at birth if they are to be raised in confinement.
18. Keep pigs warm, dry, and free of drafts.
19. Wean pigs at 4 - 6 weeks of age.
20. Keep visitors out of farrowing quarters.
21. There are no substitutes for good management.

SOURCE: University of Kentucky, Animal Science Dept.

112-5-2

STARTER DIETS

Ingredient	1	2	3	4
Ground yellow corn	873	948	981	1035
Solv. soybean meal (50%)	516	490	556	504
Dried skim milk	-	100	-	100
Fish solubles	50	50	-	-
Distillers dried solubles	50	-	-	-
Dried whey (high lactose)	300	200	300	200
Stabilized fat	50	50	-	-
Sugar (cane or beet)	100	100	100	100
Calcium carbonate	15	14	15	14
Dicalcium phosphate	19	21	21	20
Iodized salt	5	5	5	5
Trace mineral premix	2	2	2	2
Vitamin premix	20	20	20	20
Antibiotics[1]	++	++	++	++
Totals	2000	2000	2000	2000

Calculated analysis

protein, %	20.0	20.0	20.0	20.0
calcium, %	.70	.70	.71	.69
phosphorus, %	.60	.60	.60	.60

1 Antibiotics should be added to provide 100 to 200 gm. per ton.

Source: University of Kentucky, Animal Science Dept.

112-5-3

Lesson 6

FEEDING AND MANAGING HOGS FROM WEANING TO MARKET

Objective -- To develop the effective ability to feed and manage hogs from weaning to market.

Problem and Analysis -- How should we feed and manage hogs from weaning to market?

-General management practices
-Pasture versus confinement feeding
-Selecting a method of feeding
-Nutrient requirements of growing-finishing swine
-Providing a balanced ration
-Feeding management

Content

I. General Management Practices

A. Worming
   1. Worm pigs about 2 weeks after weaning and again 30 - 50 days later.
   2. Use a safe approved worming material such as Dichloruous (Atgard) or Piperazine.

B. Control lice and mange by spraying with malathion or lindane as needed.

C. Ringing of pigs is practical when rooting is a problem.

D. Control flies at all times.

E. Vaccinate for erysipelas if this is a problem.

F. Group pigs according to size in groups of 25 or less. It is recommended that the range in weight should not exceed 20% above or below the average.

G. The following floor space is recommended:

*Weight of Pig	Solid Floor	Slotted Floor
25 - 40 lbs.	6 sq. ft.	3 sq. ft.
40 - 75 lbs.	8 sq. ft.	4 sq. ft.
75 - 150 lbs.	10 sq. ft.	6 sq. ft.
150 - mkt.	12 sq. ft.	8 sq. ft.

H. If pigs are finished in confinement, use a sprinkling system when the temperature exceeds 80° F.

I. The use of sanitary hog wallows during the hot summer months is recommended if animals are on pasture or in dry lots. Up to 50 pigs can be accomodated per 100 sq. ft. of wallow provided shade is nearby.

II. Pasture Versus Confinement Feeding

A. Advantages of pasture feeding
1. Concentrate requirement reduced
2. Lower investment in equipment
3. Lower management ability required
4. More flexible
5. Initial investment recovered sooner
6. Slightly better carcasses
7. Rations less expensive
8. Less of a problem in disposing of manure

B. Disadvantages of pasture feeding
1. Somewhat slower gains
2. Environment more difficult to control
3. Extremes in weather require special attention
4. Larger land investment
5 Less of an opportunity to observe animals
6. Internal parasites may be more of a problem

C. Recommended practices for a pasture system
1. Rotate pastures yearly.
2. Pastures should be well drained.
3. Alfalfa or sudan hybrids can be used for summer pastures.

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* SOURCE: University of Kentucky Animal Science Department

4. Small grains are suggested for temporary winter pastures.
5. Provide adequate shade in the summer and adequate shelter in the winter.
6. On a good legume or grass-legume mixture, provide one acre of pasture for 20 growing-fattening hogs on a full feeding program and 10 to 15 per acre on a limited feeding program.

D. Advantages of confinement feeding
1. Better adapted to large volume production
2. More animals per man-hour of labor
3. Less land required
4. Increased production efficiency
5. Better year-round working conditions
6. Easier to detect disease
7. Pastures can be used for other livestock
8. Better control of environment
9. Fencing costs are not as high

E. Disadvantages of confinement feeding
1. Larger concentration of disease
2. Requires greater managerial skills
3. Greater initial expense
4. Requires more total labor
5. Manure disposal problems

F. Recommended management practices for confinement feeding
1. All lots, buildings, and equipment should be completely cleaned and free of hogs at least one week between hog crops.
2. Sort pigs into pens according to size and age.
3. Don't put over 25 pigs per pen.
4. Keep feeding floors clean.
5. Provide sufficient floor and water space.

III. Selecting a Method of Feeding

A. Methods of feeding
1. Self-feeding a complete mixed ration
2. Self-feeding a free-choice ration
3. Limited feeding

B. Self-feeding a complete mixed ration

1. Recommended method of feeding growing-finishing swine
2. Overeating or undereating of supplement is not a problem
3. Improves feed utilization and rate of gain
4. Insures that each animal gets a balanced ration
5. Lends itself better to automation

C. Self-feeding a free-choice ration
1. Undereating or overeating the supplement may be a problem
2. Economical way to feed hogs
3. Saves mixing costs
4. Requires less attention to details

D. Limited feeding
1. Restricting the amount of feed to 70 - 80% of what the animal would normally consume
2. Reduces backfat thickness somewhat and may improve feed efficiency
3. Slower growth rate and it takes longer to market
4. Usually it is not a sound economical practice

E. Methods of preparing feeds
1. Pelleting
   a. Improves feed utilization if feed wastage is a problem
   b. Usually not economical if costs of pelleting are more than $3.00 per ton
2. Grinding
   a. Improves rate of gain and feed utilization.
3. Liquid or paste

IV. Nutrient Requirements of Growing-Finishing Swine

A. Nutrient needs of hogs
1. Energy
2. Protein
3. Minerals
4. Vitamins
5. Water

B. Energy

1. Cereal grains are the primary sources of energy for hogs.
2. Corn is an excellent source of energy.
3. Other grains may be substituted for corn when price and availability justify.
4. Cereal grains are deficient in many vitamins, minerals and may be deficient in the amount and/or quality of protein.
5. Feeding high-lysine corn may solve some of the protein problems in producing hogs if yields of this type of corn can be improved.

Note: Some experiments show that feeding high-lysine corn could reduce feed costs by $3.75 per hog.

C. Protein

1. For years protein has been considered one of the most critical nutrients in swine rations.
2. The ration should be balanced for quality of protein as well as for the amount of protein.
3. Lysine is the most limiting amino acid in swine nutrition.
4. Suggested protein allowances in the ration:

Grower diet (35 -75 lbs.)	16 - 18%
Developer diet (75 - 125 lbs.)	14 - 16%
Finisher diet (125 lbs. to mkt.)	12 - 14%

5. Soybean meal is the most widely used protein supplement for hogs.
   a. It is well balanced in amino acids and very palatable.
6. Tankage, meat and bone meal, milk products, fish meal, and cottonseed meal also can be used as a supplemental protein source. (See master at end of lesson.)

D. Minerals

1. Minerals likely to be deficient in the feedstuffs are calcium, phosphorus, sodium, chlorine, and the trace minerals, iron, copper, manganese and zinc.
2. Maintain a desirable calcium-phosphorus ratio in the ration (about 1.2 to 1).
   a. Too much of either interferes with the

adsorption of the other.

*3. Mineral mixes for swine:

Ingredient	1	2	3
Ground limestone ($CaCO_3$)	600	600	300
Dicalcium phosphate	900	-	-
Defluorinated rock phos.	-	900	-
Steamed bone meal	-	-	1200
Salt	400	400	400
Trace-mineral mix	100	100	100

Trace-Mineral Mix

Ingredient	Percent Concentration in Premix
Copper	1.00
Iodine#	.03
Iron	10.00
Manganese	6.00
Zinc	10.00

Iodine need not be included in trace mineral mix if .25 - .5% iodized salt is included in diets.

E. Vitamins

1. Those most likely to be deficient are vitamins A, D, B_{12}, riboflavin, pantothenic acid, niacin and sometimes choline and vitamin E.
2. Vitamin premixes are ralatively inexpensive, and their use in swine rations is recommended.

*3. Composition of vitamin premix:

Vitamin	Amount in Package
Vitamin A	2.0 million I.U.
Vitamin D_2 or D_3	0.4 million I.U.
Riblflavin	4.0 grams
Pantothenic acid	10.0 grams
Niacin	20.0 grams
Vitamin B_{12}	10.0 milligrams
Carrier to	10.0 pounds
	10.0 pounds

* SOURCE: University of Kentucky Animal Science Department

F. Water
   1. On the average, swine will consume 2 pounds (1 qt.) of water for each pound of feed consumed.
   2. Limiting water intake will limit feed intake and reduce gain in pigs.

G. Feed additives
   1. Additives are not classified as nutrients, but are often added for growth-promoting properties and beneficial effects on the general health of pigs.
   2. Types of additives
      a. Antibiotics
      b. Arsenicals

V. Providing a Balanced Ration

A. Finely ground corn and soybean meal fortified with adequate levels of minerals and vitamins will support maximum gains and feed efficiency.

B. Blending corn with a commercial protein supplement will also furnish the nutrient needs of growing-finishing swine.
   1. These materials are formulated to supply all the nutritive requirements when mixed with grain in the proper proportion.
   2. Mixing directions when using a 40% developer-finisher commercial supplement and corn:

Protein in Complete Feed (%)	12	13	14	15	16
Corn (pounds)	1795	1730	1665	1600	1535
Supplement (pounds)	205	270	335	400	465
Grain (supplement ratio)	8.76	6.41	4.97	4.00	3.30

   3. Cost must be considered before using premixed supplements.
      a. If soybean meal can be purchased for $20.00 a ton less than a good 40% supplement, it is usually economical to do your own mixing.

*C. Grower Diets (for pigs weighing 35 - 75 pounds):

Ingredient	1	2	3	4
Ground yellow corn	1413.5	1436.5	1476.5	1451.5
Soybean meal (44%)	390	416	424	482
Meat and Bone Meal	50	50	50	-
Dried Whey	50	50	-	-
Distillers dried solubles	50	-	-	-
Calcium carbonate	11	10	11	16
Dicalcium phosphate	9	11	12	24
Iodized salt	10	10	10	10
Trace-mineral premix	1.5	1.5	1.5	1.5
Vitamin premix	15	15	15	15
Antibiotics#	++	++	++	++
Totals	2000	2000	2000	2000

Calculated Analysis

Protein (%)	17.0	17.0	17.0	17.0
Calcium (%)	.65	.64	.65	.64
Phosphorus (%)	.55	.55	.55	.55

Add antibiotics to provide 50 to 100 gm. per ton.

*D. Developer Diets (for pigs weighing 75 to 125 pounds):

Ingredient	1	2	3
Ground yellow corn	1584	1606	1577
Solv. soybean meal (44%)	276	302	364
Meat and bone meal	50	50	-
Distillers dried solubles	50	-	-
Calcium carbonate	12	12	12
Dicalcium phosphate	7	9	21
Iodized salt	10	10	10
Trace-mineral premix	1	1	1
Vitamin premix	10	10	10
Antibiotics #	++	++	++
Totals	2000	2000	2000

Calculated analysis

Protein (%)	13.1	13.1	13.0
Calcium (%)	.60	.59	.60
Phosphorus (%)	.50	.50	.50

Add antibiotics to provide 20 to 50 gm. per ton.

*SOURCE: University of Kentucky Animal Science Department

*F. Finisher Diets (for pigs weighing 125 lbs. to market):

Ingredient	1	2	3
Ground yellow corn	1691	1712	1684
Solv. soybean meal (44%)	168	196	256
Meat and bone meal	50	50	-
Distillers dried solubles	50	-	-
Calcium carbonate	11	10	16
Dicalcium phosphate	9	11	23
Iodized salt	10	10	10
Trace-mineral premix	1	1	1
Vitamin premix	10	10	10
Antibiotics#	++	++	++
Totals	2000	2000	2000

Add antibiotics to provide 20 to 50 gm. per ton.

VI. Feeding Management

A. The number of pigs per self-feeder hole should be:

	Dry Lot	Pasture
Under 25 lbs.	2	3
25 - 75 lbs.	4	4 - 5
76 lbs. to mkt.	5	5 - 6

B. The percentage of self-feeder space given to protein supplement when self-feeding a free-choice ration will depend on the palatability of grain, the supplement, and the pasture, but generally should be:

Weaning to 75 lbs.	20--25%
76 lbs. to 125 lbs.	15--20%
126 lbs. to market	10--15%

C. Three self-feeder holes, or linear feet of mineral-box space, should be allotted for 100 pigs when salt or a mineral mixture is fed free-choice.

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* SOURCE: University of Kentucky Animal Science Department

D. For hand feeding in troughs, or for hand watering, the length of the trough per pig should be:

Weaning to 75 lbs.	9 inches
75 lbs. to 125 lbs.	12 inches
126 lbs. to market	15 inches

E. One automatic watering cup should be provided for each 25 pigs.

F. The minimum-capacity waterer provided for each 10 pigs per day should be 25 gallons in summer and 15 gallons in the winter.

G. Drinking water should not fall below the temperature of 35 - 40° F. during the winter.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. Recommended management practices from weaning to market.
2. Advantages and disadvantages of pasture and confinement feeding.
3. Methods of feeding and nutrient requirements of growing-finishing swine.
4. Rations for growing-finishing swine.

B. Things to be secured from class members:
1. Feeding and management practices used by class members in growing-finishing swine.
2. Rations used by enrollees in feeding market hogs.
3. Problem areas in this phase of hog production encountered by class members.

II. Conclusions

A. Using recommended management practices such as worming; controlling flies, lice, and mange; providing sufficient floor space and a favorable environment will contribute to success in producing market hogs.

B. Pasture or confinement feeding can be used successfully in growing-finishing hogs.

C. We should self-feed a complete mixed ration for best feed utilization and rate of gain to growing-finishing swine.

D. The ration should be balanced to meet the energy, protein, mineral, vitamin, and water needs of the hog. Also include a recommended level of antibiotics in the ration.

E. Follow proven feeding management practices to help insure success in producing market hogs.

III. Enrichment Activities

A. Show and discuss the filmstrip, "Swine Digestion."

B. Guide class members into computing rations for use in their operation.

C. Have a successful producer discuss this phase of hog production with the class.

IV. Suggested Teaching Materials

A. References for Lesson 6

1. Balancing Swine Rations, Purdue University AS-326.
2. Digestion-The Conversion of Feed to Pork, Purdue University AS-321.
3. Energy for Swine, Purdue University AS-345.
4. Feed Management of Growing-Finishing Swine, Oklahoma State University No. 3654.
5. Feed Processing for Swine, Purdue University AS-370.
6. Feeding and Managing Growing and Finishing Pigs, University of Kentucky ASC-2.
7. Formulating Swine Rations, Oklahoma State University No. 3501.
8. Minerals for Swine, Purdue University AS-375.
9. National Hog Farmer Publications, A-5, A-26, A-33, E-1, E-3, E-11, E-12, E-13, E-14, E-15, E-16, E-17, E-18, E-19, E-21, E-22,

E-24, E-24-2, E-25, E-26.

10. Pastures for Hogs, University of Kentucky Leaflet 312.
11. Swine Feed Additives, University of Kentucky Department of Swine Science.
12. Swine Feeding and Management from Weaning to Market, University of Kentucky Cir. 592.
13. Swine Feeds and Feeding, University of Illinois VAS 1036.
14. Swine Production, Bundy and Diggins, Chapter 8.
15. Swine Production Guide, University of Kentucky Misc. 339.
16. Using Feed Additives, University of Kentucky Department of Swine Science.
17. Water-Its Importance in Swine Nutrition, Purdue University AS-322.
18. Wheat for Swine, Purdue University AS-332.
19. Vitamins for Swine, Purdue University AS-371.

B. Audio-visuals

1. Masters
   - -1 Daily Consumption of Feed by Pigs of Different Weights
   - -2 Withdrawal Periods for Feed Additives
   - -3 Energy, Protein Sources - Relative Values, Recommendations
2. Filmstrip

   "Digestion in Swine" (available from Purdue University)

DAILY CONSUMPTION OF FEED BY PIGS OF DIFFERENT WEIGHTS

Weight of Pig	Weight of Feed Eaten Daily	Avg. Daily Gain
40 - 50	3.0	1.2
100	5.5	1.5
150	6.5	1.8
200	8.0	2.0

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WITHDRAWAL PERIODS FOR FEED ADDITIVES

Feed Additive	Period Drug Must Be Withdrawn Before Slaughter
Arsanilic Acid	5 days
Atgard (dichlorvos)	None
Aureo SP 250 (chlortetracycline-sulfamethazine-penicillin)	7 days
Cadmium (oxide and anthranilate)	30 days
Carbarsone	5 days
Chlortetracycline	None
Bacitracin (all forms)	None
Hygromix (hygromycin B)	2 days
4-Nitrophenylarsonic Acid	5 days
Furazolidone	None
Furox (furazolidone)	None
Neomycin	None
Neo-Terramcin (neomycin-oxytetracycline)	None
Nitrofurazone	None
Oleandomycin	None
Penicillin (procaine)	None
Penicillin and Streptomycin	None
Piperazine	None
Roxarsone (3-nitro)	5 days
Sodium Arsanilate	5 days
Terramycin (oxytetracycline)	None
Tylan (tylosin)	None
Tylan Plus Sulfa (tylosin-sulfamethazine)	5 days

Source: National Hog Farmer, Bulletin E-1.

112-6-2

ENERGY, PROTEIN SOURCES
RELATIVE VALUES, RECOMMENDATIONS

Energy	Relative Value	Percent to use in: Ration	Supplement	Comments
Corn	100	25 - 95	---	Very palatable, excellent
Barley	85 - 90	25 - 90	---	Corn substitute
Oats	75 - 85	9 - 30	---	Bulky, limited amounts used
Wheat	95 - 100	25 - 90	---	Corn substitute
Sorghum (milo)	95	25 - 95	---	Corn substitute
Bakery waste	90 - 100	0 - 50	---	Corn substitute
Tallow, greases	230 - 240	0 - 5	---	Very high energy, corn replacement, need antioxidant
Protein				
Cottonseed meal	85	0 - 5	0 - 20	Gossypol (toxic) low in lysine
Linseed meal	80	0 - 5	0 - 20	Low lysine
Soybean meal	100	5 - 25	50 - 85	Well-balanced amino acids, very palatable
Fish meal menhaden	115	0 - 10	0 - 25	High quality, expensive
Meat scrap	100	0 - 10	0 - 30	Low tryptophan, isoleucine
Tankage	110	0 - 10	0 - 30	Low tryptophan, isoleucine
Skimmilk, dry	100	0 - 20	0 - 25	Excellent, costly
Alfalfa meal	---	0 - 20	0 - 25	Good vitamin source, unpalatable

Source: National Hog Farmer, Bulletin E-18.

112-6-3

Lesson 7

PROVIDING HOUSING AND EQUIPMENT FOR THE HOG OPERATION

Objective -- To develop the effective ability of farmers to provide adequate housing and equipment for a successful hog operation.

Problem and Analysis -- What housing and equipment will be needed for a successful hog operation?

- -Environmental factors
- -Type of housing for hogs
- -Housing and equipment for the breeding herd
- -Housing and equipment for the sow and litter
- -Housing and equipment for finishing market hogs

Content

I. Environmental Factors

A. Temperature

1. A pig's temperature requirements for optimum performance will vary with age.
2. A very young pig may perform best at a temperature of 90° F., but the sow has a functional temperature of about 60 to 65° F.
3. Temperature range for swine*

	Ideal	Functional Range
Farrowing house	65-70 (° F.)	50-85 (°F.)
Pigs' nest at birth	90-95	80-95
Nursery-sows	60-65	50-85
Pig quarters (10-50lbs.)	65-70	50-85
Growing quarters (50-120 lbs.)	65-75	60-80
Finishing quarters (120-mkt.)	50-70	40-80

* SOURCE: University of Kentucky

4. Spray-cooling hogs
   a. Provide one nozzle per 25 - 30 hogs.
   b. The nozzles should be 4 to 6 feet from the floor.
   c. Place nozzles about 8 feet apart.
   d. The system should provide for thermostatic water shutoff at 78° F.

B. Ventilation
   1. Excessive moisture can directly and indirectly cause disease problems, extra labor, and rapid deterioration of the building.
   2. Each sow and litter adds over a gallon of water a day to the air in the farrowing unit.
   3. Minimum ventilation rates*

	Ventilation Rate, CFM#	
	Winter	Summer
Farrowing unit (sow and litter)	80	350
Nursery unit (30 - 50 lb. pig)	20	100
Growing-finishing unit (50 - 225 lb. pig)	35	150
Breeding and gestation unit (boar, sow, gilt)	50	350

Cubic feet per minute. These values are considered minimum rates under normal conditions.

C. Space requirements (See Master 112-7-3.)

* SOURCE: University of Illinois, Cir. 1064.

D. Waste disposal
   1. Manure disposal is one of the biggest problems with confinement housing.
   2. The lagoon and liquid manure system has become popular in the last few years.
   3. Some characteristics of a desirable lagoon are:
      a. Should be located some distance from the swine building and farm houses.
      b. Should have adequate size.
         1) Water depth of 5 to 6 feet
         2) Surface area of approximately 30 sq. ft. for each hog in the unit
      c. Surface water should not drain into the lagoon.
   4. The liquid manure disposal system:
      a. Manure is pumped into a tank and spread over a field.
      b. Size of the storage tank will depend on the number of hogs and how often the tank is emptied. A market hog will produce about 2 gallons of liquid manure per day.

II. Type of Housing for Hogs

A. Confinement housing
   1. Advantages
      a. More animals produced per man-hour of labor
      b. Less land required
      c. Increased production efficiency
      d. Better year-round working condition
      e. Easier to detect disease
      f. Easier to clean
   2. Disadvantages
      a. Larger concentration of disease
      b. Requires greater managerial skills
      c. Greater initial expense
      d. Greater manure disposal problems
   3. Confinement is recommended when:
      a. The operator plans to have a large volume production for 10 or more years.
      b. Top level management is available.
      c. A multiple farrowing schedule is used.
      d. Labor and space are limited.
      e. Capital is available.

4. Floor types for confinement housing
   a. Concrete floors
      1) More manure-handling problems
      2) Cooler in the summer
      3) Easier to disinfect
   b. Slotted floors
      1) Higher cost
      2) Less manure handlingg problems
      3) May have greater ventilation problems

B. Portable housing
   1. Advantages
      a. Can move
      b. Less cost per unit
      c. Low investment per litter
      d. Can easily isolate new animals
      e. Less concentration of disease
      f. Lower maintenance cost
      g. More adaptable to tenant farming
      h. Reduces manure-handling problems
      i. Less management required
      j. Readily adapts to the rotation of pasture
   2. Disadvantages
      a. Less environment control
      b. Limited to lower volume
      c. Not readily adaptable to automation
      d. More labor per litter required
      e. Sanitation not adapted to automation
   3. Portable housing is recommended when:
      a. Twenty or less sows farrowed per year
      b. Farrow once or twice per year
      c. Have pasture available for proper rotation
      d. Desire a minimum building investment
      e. Labor is available
      f. Producer is a beginner

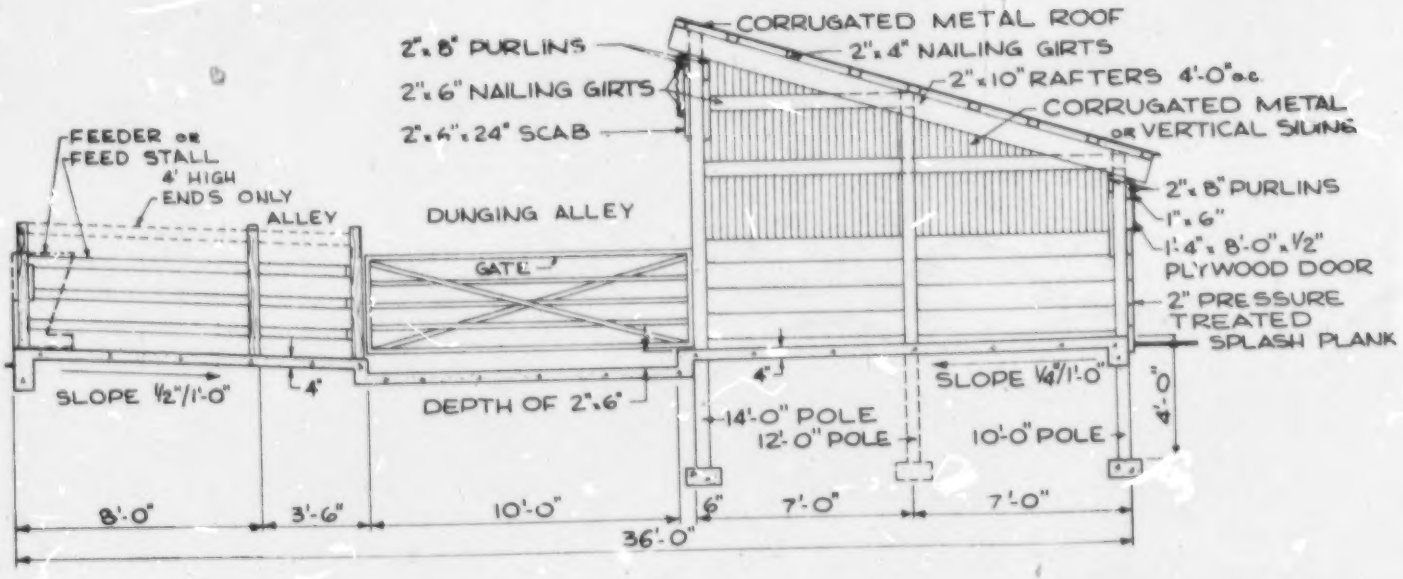
C. Combination of confinement and portable housing
   1. Many producers are successful using confinement housing for the sow and litter and portable housing for the breeding herd and for finishing hogs.

III. Housing and Equipment for the Breeding Herd

A. Farmers usually keep their sows on pasture in portable housing; however, group confinement of sows is gaining in popularity.

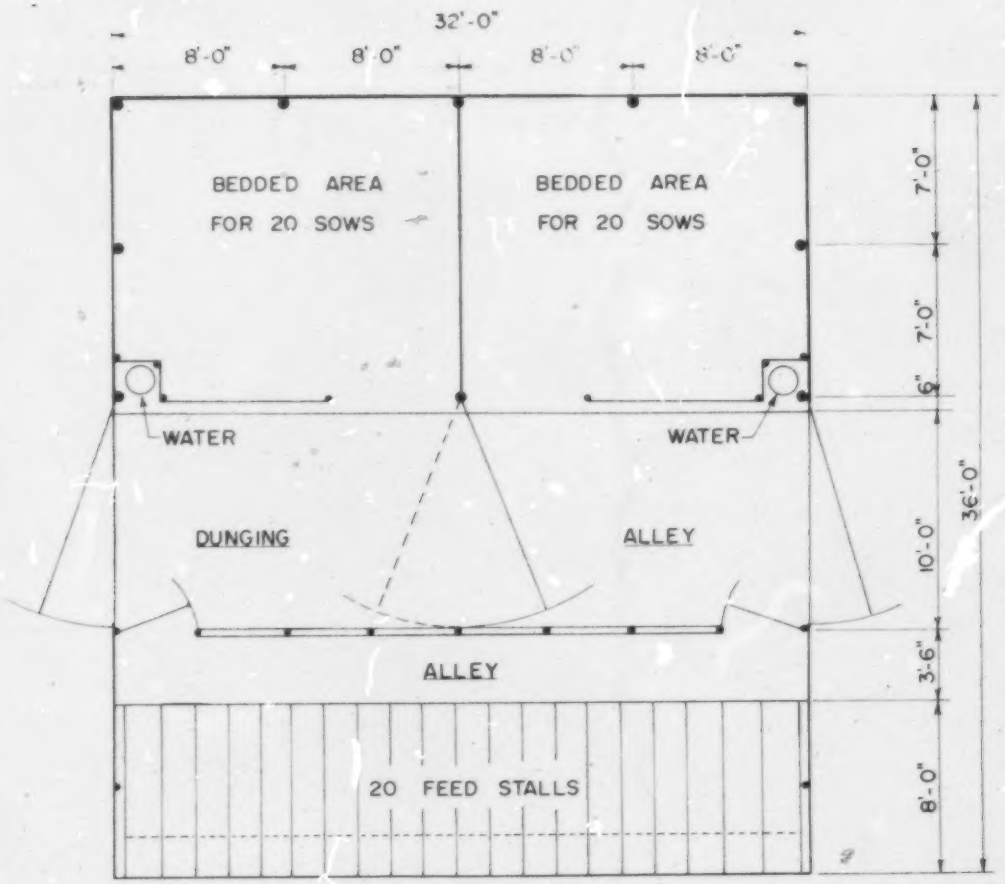
Cold Sow Herd Quarters*

Figure 1



* SOURCE: University of Minnesota, M-143.

Figure 2*



B. Portable housing should face south or southeast.

C. Some producers are successful in using tie (tether) stalls with gestating animals. These are not recommended by most universities at this time, but may be practical in the future. (For additional information on tie stalls, see Lesson 4.)

D. Additional facilities needed for the swine breeding herd:
   1. Feed stalls (8' X 20")
   2. Breeding crates
   3. Adequate fences for breeding animals on pasture; portable electric fences may be advis-

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* SOURCE: University of Minnesota, M-143.

able.

4. Feeding and watering facilities
5. Miscellaneous supplies

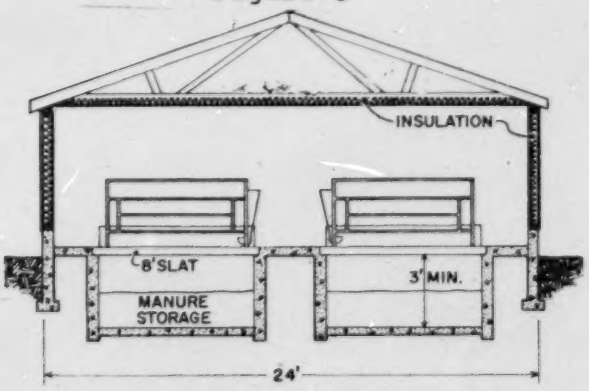
IV. Housing and Equipment for the Sow and Litter

A. Central farrowing houses provide the best environment with the minimum labor.

B. A modern central farrowing house is a specialized building that requires a large investment. Advanced planning is needed to avoid costly errors and later changes.

C. These factors should be considered in planning a central farrowing house:
   1. Basic floor plan (size and design)
   2. Temperature control
   3. Ventilation
   4. Insulation
   5. Ease of cleaning, disinfecting and daily care
   6. Facilities for the farrowing house:
      a. Farrowing crates
      b. Feeders and waterers
      c. Space heaters
      d. Office and equipment areas
      e. Sow wash
      f. Feed storage and handling
   7. Cost

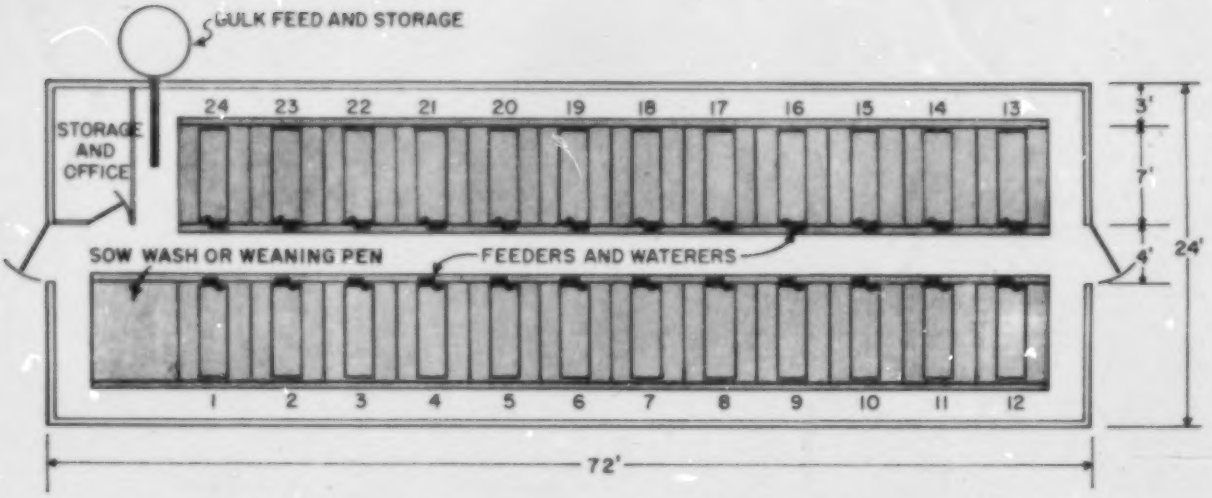
Cross Section of Slotted-Floor Farrowing House*
Figure 3



* SOURCE: University of Illinois, Cir. 973.

Figure 4

Floo. plan of slotted-floor farrowing house.


BULK FEED AND STORAGE
STORAGE AND OFFICE
24 23 22 21 20 19 18 17 16 15 14 13
SOW WASH OR WEANING PEN
FEEDERS AND WATERERS
1 2 3 4 5 6 7 8 9 10 11 12
3'
7'
4'
24'
72'

V. Housing and Equipment for Finishing Market Hogs

A. A producer can be successful using central housing or portable housing in feeding out hogs.

B. If hogs are to be fed out in confinement a nursery and finishing unit should be provided.

C. Nursery unit
   1. A nursery unit is used to grow the pigs from weaning to 70 - 80 pounds.
   2. It can be a separate building or one attached to the farrowing house.
   3. Slotted floors are recommended in the nursery unit.
   4. Proper space, ventilation, and insulation are critical in nurseries.

D. Finishing facilities
   1. Basically, there are four types of systems used to finish hogs in Kentucky:
      a. Pasture with portable equipment
      b. Drylot with open front sheds, with or without concrete slabs
      c. Open front pole structure with concrete floor and partial slats

d. Enclosed, insulated, semicontrolled environment buildings with total slotted floors

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. Environmental needs of hogs for best production
2. Types of housing for hogs
3. Housing and equipment needed for successful hog production

B. Things to be secured from class members:
1. Type of housing used in their hog operation
2. Advantages and disadvantages of the various types of housing
3. Enrollees' plans for future housing of hogs

II. Conclusions

A. Hogs function or produce at their best when favorable environmental conditions are provided. Proper temperature, ventilation, and space are essential in producing hogs. Adequate waste disposal is a must if animals are produced in confinement.

B. The types of housing of hogs are portable and confinement housing. These also may be combined to capitalize on the advantages of each. For confinement housing to be practical, the facility should be used for at least 10 years.

C. The breeding herd seems to do well on pasture in portable housing. Group confinement of the breeding herd may be practical where there is a shortage of land or if the operator wants closer supervision of his herd.

D. There seems to be a definite advantage for central farrowing houses over portable farrowing houses. The volume of production should be such to justify a central farrowing house before considering its construction.

E. Pasture or drylot with portable or open-front shed housing seems to be adequate in finishing hogs.

III. Enrichment Activities

A. Determine the size of operation needed to justify construction of confinement housing.

B. Figure costs of constructing a central farrowing house.

C. Visit a successful farrowing house in the community.

IV. Suggested Teaching Materials

A. References for Lesson 7

1. Blueprints from United States Department of Agriculture.
2. Blueprints from University of Kentucky.
3. Farrowing Houses for Swine, Cir. 973, University of Illinois.
4. Hog Farrowing Houses, M-144, University of Minnesota.
5. Housing and Feeding for Gestating Sows, M-143, University of Minnesota.
6. Kentucky Agricultural Engineer, July-Sept. 1970, University of Kentucky.
7. National Hog Farmer Publications, Bulletins F-1 through F-45.
8. Swine Handbook--Housing and Equipment, Midwest Plan Service, Iowa State University, The price is $2.00.
9. Swine Production, Bundy and Diggins, Chapter 10.
10. Ventilation for Swine, Cir. 862, University of Illinois.

B. Addio-visuals

1. Masters
   - -1 Estimated Investment Costs for Swine Buildings and Equipment
   - -2 Farrow-to-Finish Confinement Unit
   - -3 Space Needs of Swine
   - -4 Cold Sow Herd Quarters (end view)
   - -5 Cold Sow Herd Quarters (top view)

ESTIMATED INVESTMENT COSTS FOR SWINE BUILDINGS AND EQUIPMENT

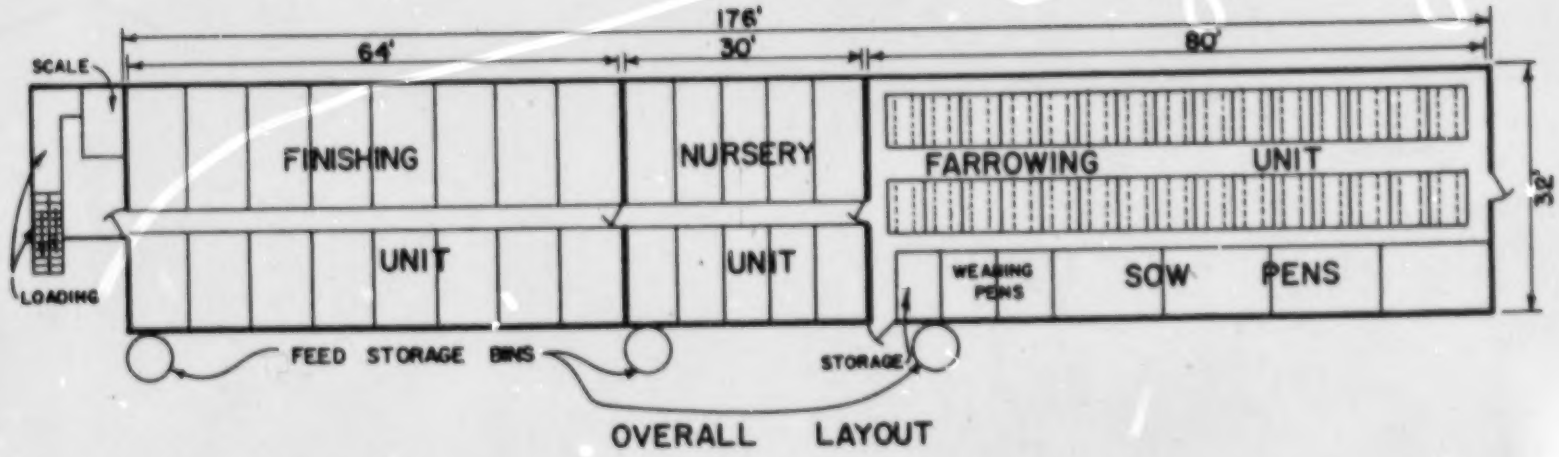
Item	Investment Per Unit	Costs* Per Litter Capacity
Permanent Farrowing house (Structure only)		
Solid floor	$3.40 / sq. ft.	$200
Slotted floor	4.00 / sq. ft.	275
Permanent Farrowing house (with usual equipment)		
Solid floor	4.90 / sq. ft.	290
Slotted floor	5.20 / sq. ft.	350
Portable Housing		
Individual house 7' X 8' with floor	100.00	100
Two-sow shelter (no floor)	50.00	25
Farrowing supplies		
Stalls or crates	50.00	50
Pig Brooders (heat lamps, etc.)	5 - 15	10
Sow feeder	5.00	5
Baby pig creep	2.00	2

*Costs are for new material, contracted construction
Does not include feed- or manure-handling equipment

Source: University of Illinois, Department of Agricultural Economics

112-7-1

FARROW-TO-FINISH CONFINEMENT UNIT



OVERALL LAYOUT

SOURCE: National Hog Farmer publication, Bulletin No. F-32.

Space Needs for All Ages of Swine

Unit & Period	Shelter, sq. ft./ head	Concrete outside lot, sq. ft./head	Water head/cup	Feeder	
				Hand,* ft./head	Self-fed head/door, head/foot
Sow					
Breeding & gestation	15	None	15	2	2
Farrowing					
Pens	56	30**	1	2	1
Stall	35	30**	15	2	2
Pig					
Starting					
Solid floor	5	--	50	--	1
All or partially slotted floor	3	--	50	--	1
Growing					
Solid floor					
Weaning-75 lbs.	3	3	50	3/4	5
75 - 125 lbs.	4	4	40	1	4
125-220 lbs.	5	7	30	1 1/4	4
All or partially slotted floor					
Weaning-75 lbs.	4	--	50	3/4	5
75 - 125 lbs.	6	--	40	1	4
125 - 220 lbs.	8	--	30	1 1/4	4

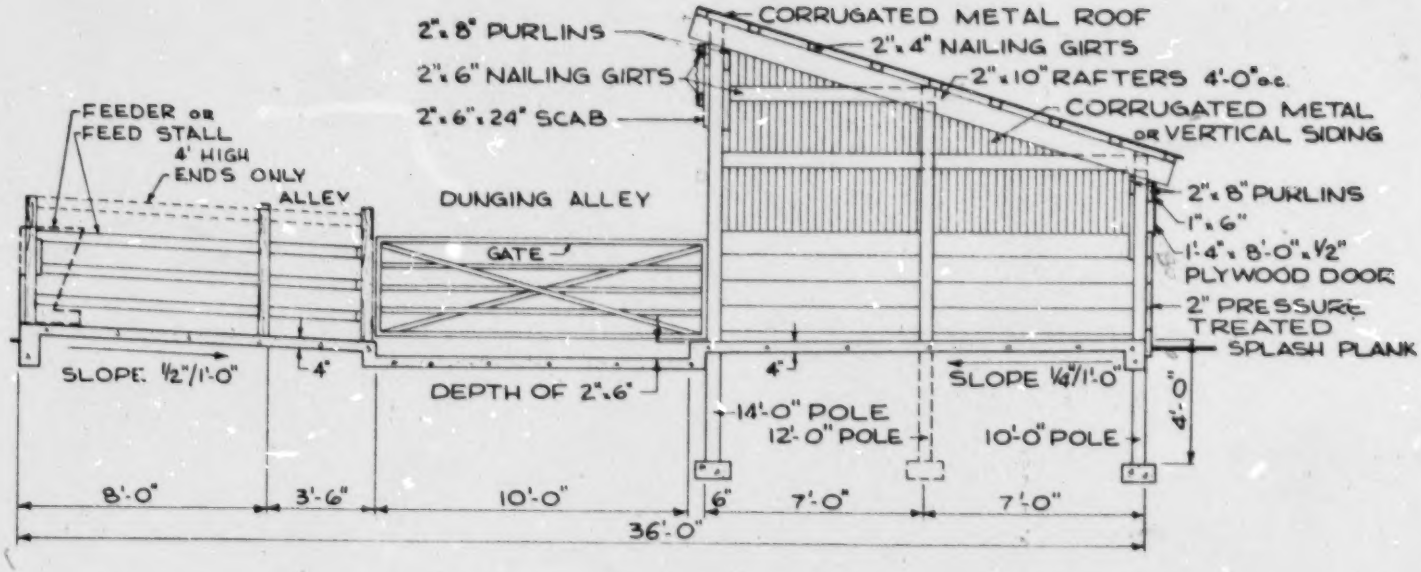
* Figure both sides of a feeder. For example, a 6 foot feeder open on both sides has 12 feet of feeding space.

** Optional

Source: South Dakota State University, FS 278

112-7-3

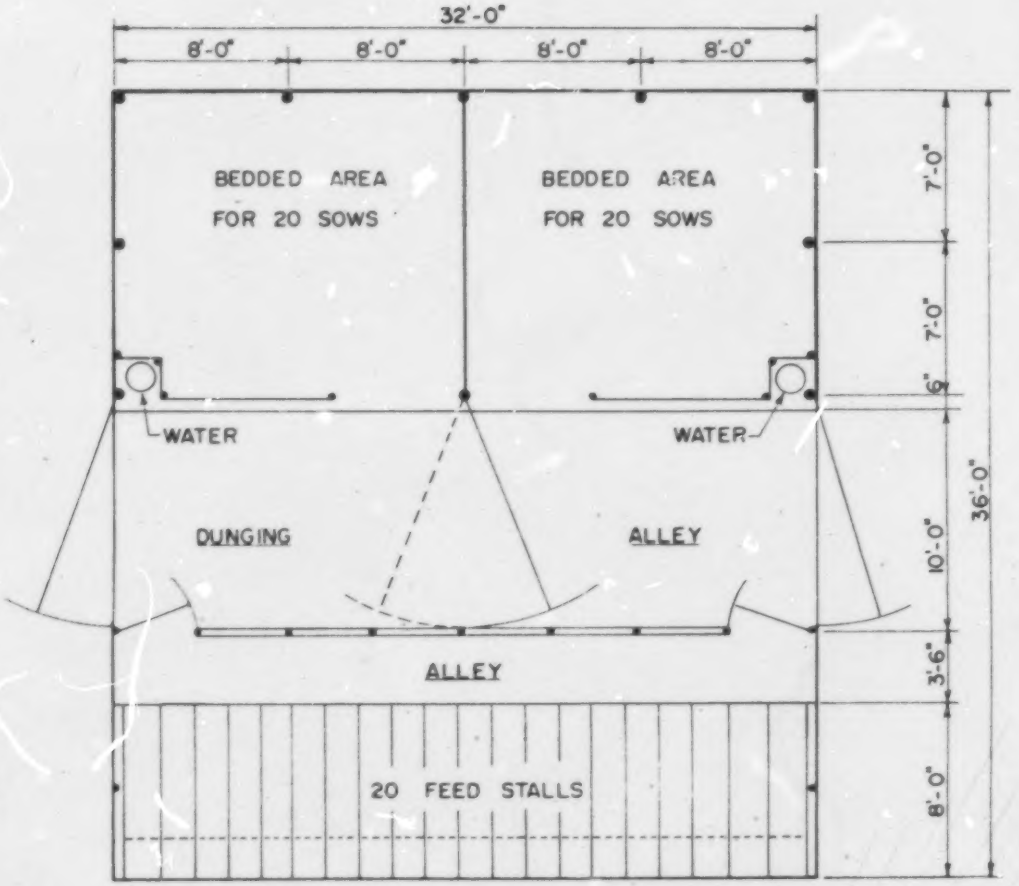
Cold Sow Herd Quarters*



* SOURCE: University of Minnesota, M-143.

112-7-4

Cold Quarters for Sow Herd
(Top View)



112-7-5

Lesson 8

KEEPING THE HERD HEALTHY

Objective -- To develop the effective ability of farmers to keep the swine herd healthy.

Problem and Analysis -- What practices should we use to maintain the health of the herd?

-Importance of keeping the herd healthy
-Management practices in maintaining herd health
-Common diseases of hogs
-Parasite pests of hogs
-Health program for the swine herd

Content

I. Importance of Keeping the Herd Healthy

A. According to USDA figures, the total annual loss to the hog industry from diseases and worms is about $800,000,000 (500,000,000 from diseases and 300,000,000 from worms). This amounts to $8 per pig marketed in the U.S.

B. Each year nearly one-sixth of the farm value of all livestock is lost because of disease, parasites, and insects.

C. It is estimated that only about one-third of the pigs farrowed are grown out as healthy pigs.

D. Good management and sanitation cost very little and can save the producer many dollars.

E. Producers should think of disease prevention as a means of increasing production, feed efficiency, and profits.

II. Management Practices in Maintaining Herd Health

A. Sanitation
   1. Sanitation and management must be practiced; they cannot be purchased.
   2. Procedures to be remembered in a thorough sanitation program:
      a. Disposal of dead animals
      b. Disposal of contaminated body discharges and bedding
      c. Thorough cleaning and disinfecting of buildings and equipment

B. Isolation
   1. Isolate all new stock for a period of 30 days
   2. Isolate all sick animals

C. Follow a planned vaccination program

D. Allow for periodic rest periods of the usable facilities

E. Rotate lots and pastures as often as possible

F. Keep all visitors, vehicles, rodents, and birds out of hog facilities

G. Follow a planned worming program

H. Provide a well balanced ration fortified with adequate levels of antibiotics
   1. Do not attempt to use feed additives to replace good sanitation and management.

I. Reduce stress factors in the environment

J. Buy breeding stock only from herds that you know are healthy

K. Blood-test all purchased animals for brucellosis and leptospirosis

L. Diagnose disease promptly and follow recommendations of the local veterinarian

M. Using SPF (Specific Pathogen Free) swine

1. SPF hogs are free from the virus diseases that are passed from pig to pig by direct contact.
2. Virus pneumonia, rhinitis, and some forms scours are controlled.
3. This is an expensive method of obtaining breeding stock.

III. Common Diseases of Hogs

A. Consider cause, symptoms, prevention, and treatment for the following:
1. Hog Cholera
2. Erysipelas
3. Atrophic Rhinitis
4. Brucellosis
5. Vesicular Exanthema (VE)
6. Virus Pig Pneumonia (VPP)
7. Transmissible Gastroenteritis (TGE)
8. Leptospirosis
9. SMEDI Viruses (Stillbirth, Mummification, Embryonic Deaths, and Infertility)
10. MMA (Mastitis-Metritis-Agalactia)
11. Baby-Pig Scours
12. Swine Dysentery
13. Edema Disease (Gut or Stomach Edema)
14. Shaky Pig Disease
15. Greasy Pig Disease
16. Anemia
17. Trichinosis
18. Swine Abscesses
19. Swine Arthritis
20. Parakeratosis
21. Tail Biting
22. Poisoning

IV. Parasite Pests of Hogs

A. Consider life cycle, symptoms, prevention, and treatment for the following:
1. Internal parasites
   a. Large roundworms
   b. Lungworms
   c. Kidney worms
   d. Whipworms
   e. Nodular worms
2. External parasites

a. Mange mite
b. Lice
c. Flies

V. Health Program for the Swine Herd

A. After weaning and before breeding
1. Cull animals whose offspring have shown evidence of any defect or abnormalities that might have been inherited.
2. Also cull sows that showed signs of MMA disease.
3. Maintain a closed herd as much as possible.
4. Immediately after weaning, blood test the breeding herd for brucellosis and vaccinate for leptospirosis.
5. Vaccinate for erysipelas if this is a problem.

B. Breeding and gestation period
1. House sows in dry, draft-free, well-ventilated quarters.
2. Control external parasites by spraying with a good insecticide.
3. If TGE has been a problem, vaccinate sows 2 months and 1 month before farrowing.
4. Treat sows for worms 1 month to 2 weeks before they are moved into the farrowing quarters.

C. Farrowing to weaning
1. Provide for sanitation in the farrowing unit at all times.
2. Keep a close watch on the sow for MMA disease.
3. For additional information, see Lesson 5.

D. Weaning to market
1. Worm pigs at about 50 pounds and again at 100 pounds.
2. Vaccinate for erysipelas if this is a problem.
3. Control external parasites as needed.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
   1. Importance of management in keeping a healthy herd
   2. Management practices used by successful hog producers in controlling diseases and parasites
   3. The place of sanitation in keeping the herd healthy
   4. Diseases and parasites that are common in the community and practices to aid in their control

B. Things to be secured from class members:
   1. Disease and parasite problems of the enrollees in their hog operation
   2. Practices used by enrollees in combating diseases and parasites
   3. The role of the veterinarian in a health program for the swine herd

II. Conclusions

A. Hog diseases and parasites are costly to the pork producer and their control should not be left to chance. Producers should think of disease prevention as a means of increasing production, feed efficiency, and profits.

B. Using recommended management practices such as sanitation and isolation of new and sick animals will aid in the control of diseases and parasites.

C. The producer should be aware of the diseases and parasites that are prominent in the community and be familiar with preventive and treatment measures for them.

D. A planned and operational health program for the swine herd will aid in controlling diseases and parasites.

III. Enrichment Activities

A. Have a local veterinarian talk to the class on disease and parasite control for the swine herd.

B. Show and discuss the filmstrip, "Pests of Swine."

C. Guide class members into planning a health program for their hog operation.

IV. Suggested Teaching Materials

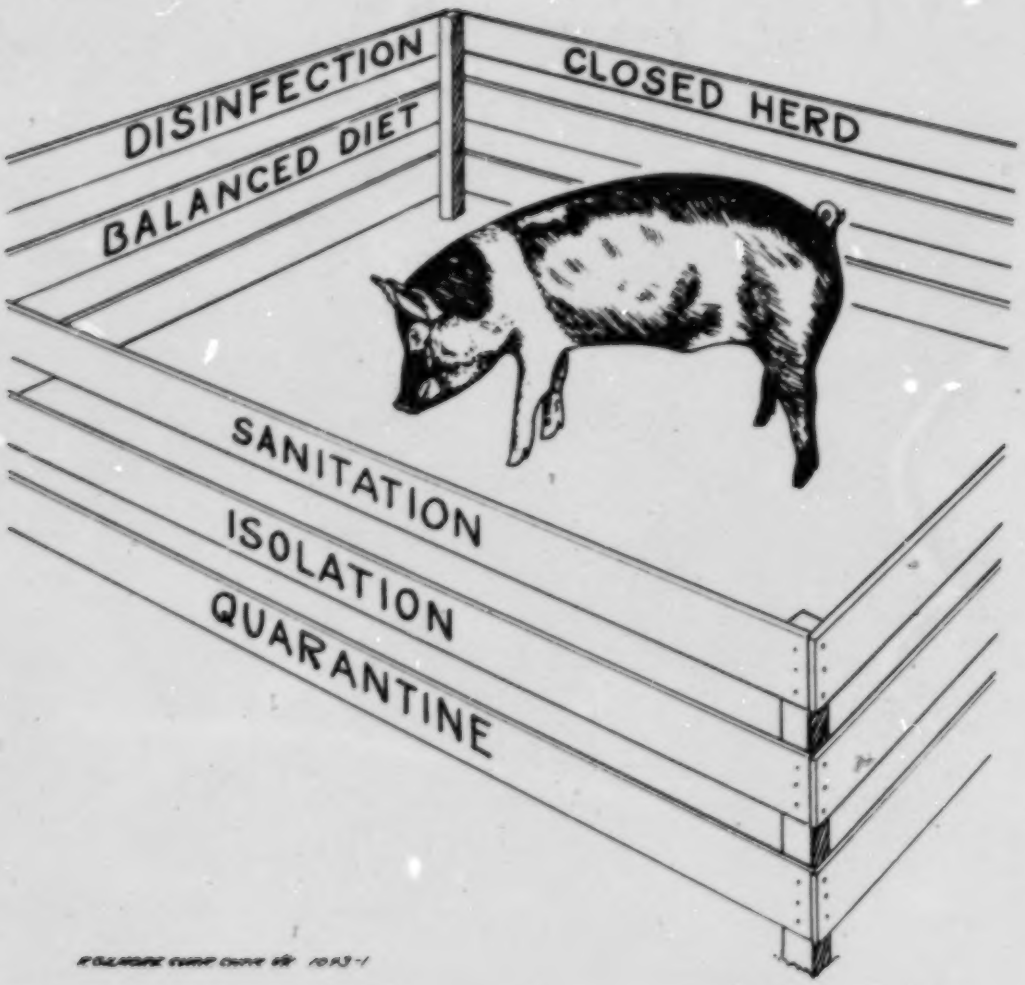
A. References for Lesson 8

1. A Guide to Swine Herd Health, No. 3652, Oklahoma State University.
2. Health Handbook for Profitable Swine Production, Kansas State University.
3. Insecticide Recommendations for Swine, 1972, University of Kentucky.
4. National Hog Farmer, Publications No. D-1 through D-28.
5. Swine Production, Bundy and Diggins, Chapter 11.
6. Swine Production Guide, University of Kentucky, pp. 17-30.
7. Swine Sanitation, AS-324, Purdue University.

B. Audio-visuals

1. Masters
   - -1 Fence Out Animal Diseases
   - -2 Vaccination and Parasite Control Schedule for Swine
   - -3 Insecticide Recommendations for Swine
2. Filmstrip
   a. "Pests of Swine" (available from Nasco)

FENCE OUT ANIMAL DISEASES



112-8-1

Vaccination and Parasite Control Schedule for Swine

Time	Brucellosis	Leptospirosis	Erysipelas	Internal Parasites	External Parasites
Before Breeding	Test all breeding stock annually. Test boar every 6 months. Maintain Validated Brucellosis Free Herd.	Vaccinate breeding stock before each breeding period.			
Gestation Period			Vaccinate sows 3 weeks before farrowing--also vaccinate the boar.	Treat sows for worms approximately 3 weeks before farrowing.	Spray sows for lice approximately 3 weeks before farrowing.
Pigs 6 to 12 weeks of age			Vaccinate pigs in this period		
Pigs 12 to 15 weeks of age				Treat pigs for worms in feed or water. Repeat every 6-8 weeks if necessary	Spray for external parasites every 60 days or as necessary

Source: University of Kentucky Swine Production Guide, Misc. 339

112-8-2

Insecticide Recommendations for Swine

PEST	FORMULATIONS	APPLICATIONS	Minimum days from last appl. to slaughter	Instructions, Precautions, and Suggestions
Lice	Ciovap (10+2.3)% EC	2 1/2 pt/16 gal water	--	Spray thoroughly. Repeat after 2 weeks.
	Coumaphos (Co-Ral) 25% WP	1/2 lb/25 gal water	--	See Label restrictions and precautions.
	Ronnel (Korlan) 5% G	1/2 lb/100 sq. ft. of bedding	14	Do not reapply Korlan within 2 weeks. Do not apply Korlan in conjunction with other systemic insecticides. Withdraw Korlan treated bedding 14 days before slaughter.
	Methoxychlor 50% WP	2 lb/25 gal water	--	Spray thoroughly. Repeat after 2-3 weeks if needed.
	Methoxychlor 25% EC	2 qt/25 gal water		
	Malathion 57% EC	1 qt/25 gal water	--	Do not use on animals less than 1 month old.
	Malathion 25% WP	4 lb/25 gal water		
	Lindane 20% EC	1 cup/25 gal	30	Use lindane in severe cases only. Pump pressures of 150-250 psi needed to properly control mange. These pesticides also control lice. Do not treat animals less than 3 months old with lindane or less than 1 month old with malathion. Keep hogs out of sun or wind for a few hours after treatment.
Mange Mite	Malathion 57% EC	1 qt/25 gal	0	
		TREATMENT NOT ON ANIMALS		
Flies on Premises	Ravap (2+0.5) lb/gal EC	12 Tbs/gal		Animals may be present when spraying but do not spray animals directly. Do not contaminate food or drinking water. Wet fly resting areas thoroughly.
	Rabon 2 lb/gal EC	12 Tbs/gal		
	Malathion 57% EC	1 qt/10 gal + 4 cups sugar		
	Ronnel (Korlan) 24% EC	3 pt/10 gal		
	Vapona 2 lb/gal EC	1 pt/6 gal		
	Dimethoate (Cygon) 23.4% EC	5 cups/10 gal		Remove animals from spray area until spray dries. Spray fly resting areas to point of run-off.
	Dipterex 1% sugar bait	Apply as purchased		Follow label instructions.

WP = wettable powder; EC = emulsifiable concentrate; pt = pint; lb = pound; gal = gallon; qt = quart; Tbs = tablespoon

SOURCE: Kentucky Misc. 261-F.

Lesson 9

MARKETING HOGS

Objective -- To develop the effective ability of farmers to market hogs efficiently.

Problem and Analysis -- How should we market hogs?

-Factors determining hog prices
-Systems of marketing hogs
-Time and weight to sell
-Choosing a market
-USDA grades of market hogs
-Marketing tips

Content

I. Factors Determining Hog Prices

A. Seasonal variations
   1. Slaughter hog numbers are usually low in June, July, and August.
   2. Selling price usually highest during these months.

B. Cyclical fluctuations
   1. Hog cycles are caused by price fluctuations.
   2. The length of the cycle may vary from 3 to 8 years, but usually averages about 4 years.

C. Supply of pork
   1. Hog-corn ration influences supply
      a. A high ration encourages farmers to increase production.
      b. A low ratio encourages producers to decrease production.

D. Demand for pork
   1. Demand is determined by:
      a. Consumer tastes and preferences

b. Changes in population
c. Price of competing meats
d. Changes in consumer incomes
e. Other factors

E. Carcass quality
1. The quality of pork that the producer puts on the market will affect hog prices.
2. Carcass quality can be measured by:
a. Carcass yield or dressing percentage
b. Carcass length
c. Backfat thickness
d. Ham-fat thickness
e. Loin-eye area
f. Percent lean and primal cuts
1) The four lean cuts:
a) Ham
b) Loin
c) Boston-butt
d) Picnic
g. Percent ham and loin
h. Complete cut-out
i. Quality of the meat
1) The carcass should be free of "pale, soft, and watery pork."

II. Systems of Marketing Hogs

A. Live-weight basis
1. Emphasis is placed on dressing percentage.
2. This method has been accepted by the meat industry and the farmer.

B. Carcass weight and grade basis
1. Discourages "filling" hogs for market.
2. Enables packer to pay more for "meat-type" hogs.
3. Encourages the production of quality hogs.
4. Permits the tracing of diseased and injuried hogs.

C. Contract production
1. Best adapted to large commercial pork producers
2. Reduces speculation in producing market hogs

III. Time and Weight to Sell

A. Time to sell
1. The supply of market hogs is greatest in the spring and fall.
2. For best prices, the producer should have market hogs ready for sale in the winter and summer.

B. Weight to sell
1. Marketing of hogs at 200 - 220 pounds is usually recommended.
a. Lighter hogs gain more economically.
b. Much of the gain on heavy hogs is fat.
2. Good meat-type hogs gain more economically when fed to heavier weights.
3. Marketing meaty-type hogs at 240 - 260 pounds from May through August and at 200 - 220 pounds the rest of the year may increase profits.

IV. Choosing a Market

A. Types of markets
1. Terminal markets
2. Auction markets
3. Cooperative sales
4. Direct sale to packing plant
5. Local or county buyer

B. Factors in choosing a market
1. Price quotations
2. Convenience
3. Marketing cost
4. Others

V. USDA Grades of Market Hogs

A. Grades
1. U.S. No.1
2. U.S. No.2
3. U.S. No.3
4. U.S. No. 4
5. Utility

B. Qualifications for market grades
1. Quality of lean

2. Expected yield
   a. Ham
   b. Loin
   c. Picnic
   d. Boston-butt
3. U.S. Grade

	Yield
No. 1 ---------	53% or more
No. 2 ---------	50 - 53%
No. 3 ---------	47 - 50%
No. 4 ---------	Less than 47%

VI. Marketing Tips

A. Limit feed prior to shipping.

B. Allow proper floor space, 3.5 sq. ft. per 200 - 225 pound hog.

C. Clean truck or trailer prior to loading.

D. Use proper bedding, such as sand or sawdust.

E. Separate hogs by weight.

F. Control extreme temperatures.
   1. Sprinkling and moving at night are good practices in hot weather.
   2. Use covered trucks in cold weather.

G. Remove obstructions from pens, truck, and loading chute.

H. Have convenient loading equipment.

I. Handle hogs carefully.

J. Use canvas slappers.

K. Minimize stress.

L. Build a reputation as a quality pork producer.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
   1. What sets hog prices
   2. Market outlets available in the community
   3. Factors in selecting a market
   4. Time and weight to market
   5. Characteristics of the various grades of hogs

B. Things to be secured from class members:
   1. Markets used by enrollees and why they choose these markets
   2. Time and weight that class members sell hogs
   3. Marketing practices used by enrollees in hog production

II. Conclusions

A. Hog prices are determined by the season of the year, supply, demand and carcass quality. Pork producers can expect highest prices by offering for sale a desirable "meat-type" hog when the supply of hogs on the market is lower than the demand for them.

B. Hogs may be marketed on the live-weight basis, carcass weight and grade basis, or by contract production. Consider marketing on the carcass weight or grade basis if high-quality, meaty hogs are produced.

C. The time and weight to market will depend upon the farrowing system used and the quality of hogs produced. Meaty-type hogs may be fed to a heavier weight because feed conversion will not be sacrificed.

D. Consider price quotations, convenience, and marketing costs when selecting a market.

E. Strive to produce a high percentage of U.S. No.1 and 2 grade of market hogs for best prices.

F. Use approved management practices to minimize stress for best results when marketing hogs.

III. Enrichment Activities

A. Show and discuss filmstrip, "USDA Swine and Pork Carcass Grades."

B. Have a local meat processor talk to the class on meat quality.

C. Visit a local meat processing plant.

IV. Suggested Teaching Materials

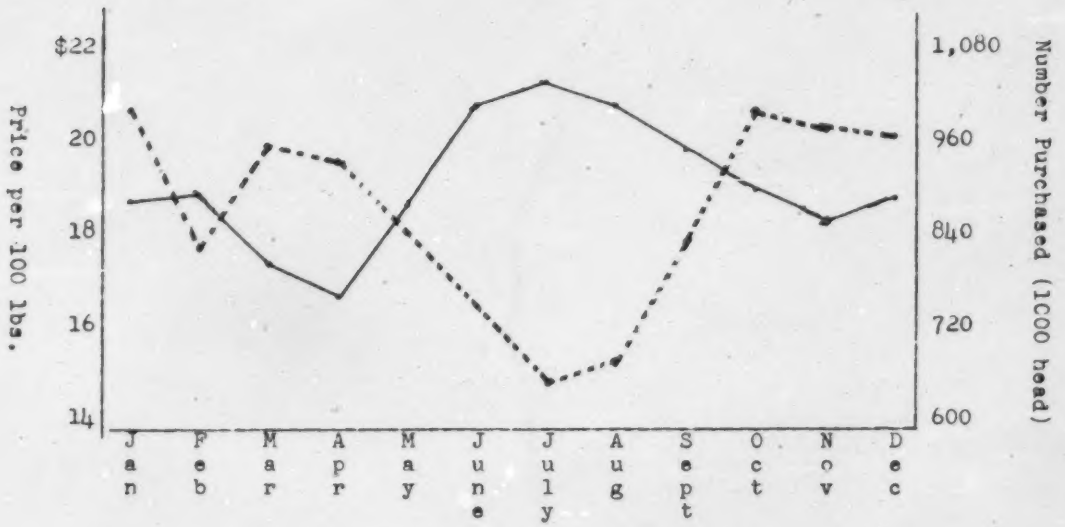
A. References for Lesson 9.

1. National Hog Farmer Publications, A-9, 10, 11, 13, 15, 16, 17, 18, 20, 21, 24, 29, 30, 44, 48.
2. Pork Carcass Evaluation, University of Kentucky, Cir. 614.
3. Pork Processing on the Farm, University of Kentucky, Cir. 621.
4. Swine Production, Bundy and Diggins, Chapter 12.
5. USDA Grades of Swine, University of Illinois, VAS 1048.
6. What Sets Hog Prices?, University of Tennessee, P-473.

B. Audio-visuals

1. Masters
   - -1 Number of Barrows and Gilts Purchased and Price
   - -2 Rate of Gain and Feed Requirements for Various Weights of Hogs
   - -3 The Price Needed to Break Even at Various Weights and Prices
2. Filmstrip
   "USDA Swine and Pork Carcass Grades" (available from the University of Illinois)

NUMBER OF BARROWS AND GILTS PURCHASED AND PRICE (1963-67)*



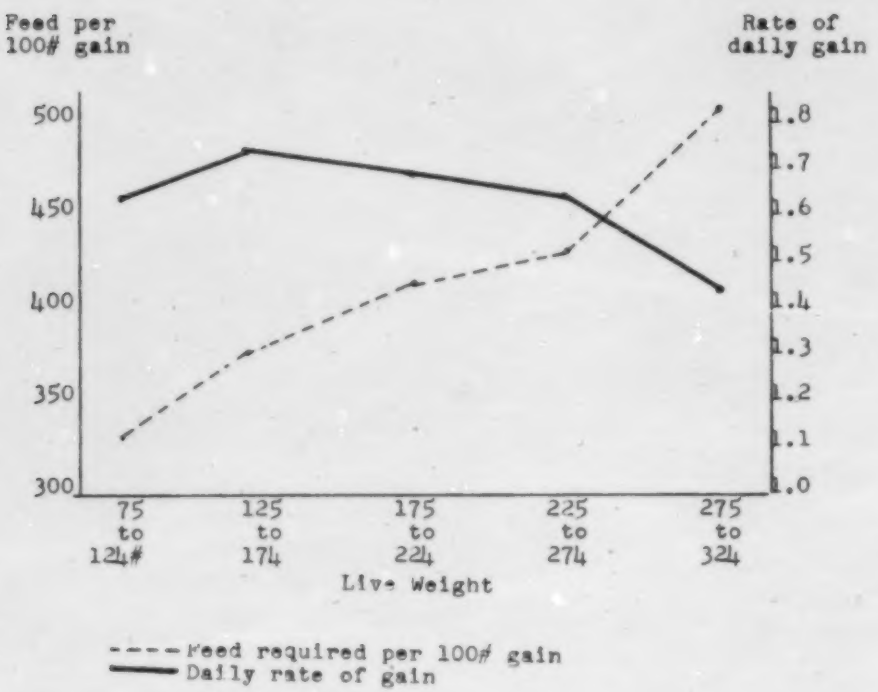
* Average of eight markets

----Number purchased
——Price

Source: Swine Production by Bundy and Diggins

112-9-1

RATE OF GAIN AND FEED REQUIREMENTS FOR VARIOUS WEIGHTS OF HOGS



Source: USDA

112-9-2

THE PRICE NEEDED TO BREAK EVEN AT VARIOUS WEIGHTS AND PRICES

Current Price of Hogs (cwt.)	If hogs now weigh 180 pounds the break-even price at: 190 lbs	200 lbs	If hogs now weigh 200 pounds the break-even price at: 210 lbs	220 lbs	If hogs now weigh 220 pounds the break-even price at: 230 lbs	240 lbs	If hogs now weigh 240 pounds the break-even price at: 250 lbs	260 lbs
When the price of corn is $1.10 per bu.								
16.00	15.99	16.01	16.03	16.10	16.09	16.19	16.11	16.23
18.00	17.89	17.82	17.94	17.92	18.01	18.03	18.03	18.08
20.00	19.79	19.62	19.85	19.74	19.92	19.87	19.96	19.93
22.00	21.69	21.43	21.75	21.57	21.84	21.14	21.88	21.78
24.00	23.58	23.23	23.66	23.39	23.75	23.54	23.80	23.53
When the price of corn is $1.25 per bu.								
16.00	16.04	16.10	16.07	16.18	16.13	16.27	16.15	16.31
18.00	17.94	17.90	17.98	18.00	18.05	18.11	18.07	18.15
20.00	19.83	19.71	19.89	19.83	19.96	19.95	20.00	20.01
22.00	21.73	21.51	21.80	21.65	21.88	21.79	21.92	21.86
24.00	23.63	23.32	23.70	23.47	23.79	23.62	23.84	23.71
When the price of corn is $1.35 per bu.								
16.00	16.07	16.15	16.10	16.24	16.16	16.33	16.17	16.36
18.00	17.97	17.96	18.01	18.06	18.08	18.16	18.10	18.21
20.00	19.86	19.77	19.92	19.88	19.99	20.00	20.02	20.06
22.00	21.76	21.57	21.83	21.71	20.95	20.92	21.94	21.91
24.00	23.66	23.38	23.73	23.53	23.82	23.68	23.87	23.76
When the price of corn is $1.45 per bu.								
16.00	16.10	16.21	16.13	16.29	16.19	16.38	16.20	16.41
18.00	18.00	18.02	18.04	18.11	18.10	18.22	18.13	18.26
20.00	19.89	19.82	19.95	19.94	20.02	20.06	20.05	20.11
22.00	21.79	21.63	21.85	21.76	21.93	21.89	21.97	21.96
24.00	23.69	23.43	23.76	23.58	23.85	23.73	23.89	23.81

Source: National Hog Farmer

112-9-3

Lesson 10

RECORD KEEPING IN SWINE PRODUCTION

Objective -- To develop the effective ability of farmers to keep and use records to improve the hog operation.

Problem and Analysis -- What use should we make of records to improve our operation?

-Need for records
-Records to keep
-Record-keeping practices

Content

I. Need for Records

A. Nothing is more important to pork producers than keeping accurate records and making proper use of them.

B. Records are the basis of herd improvement and determining financial status of the enterprise.

C. Records are your financial history showing where you have been, where you are now, and where you expect to be in the future.

D. Hog-production records will show which animal stays and which animal goes, which practice works and which does not.

E. Records are needed to:
1. Identify weaknesses in the hog operation
2. Determine income or loss from the operation
3. File tax returns
4. Provide a basis for sound decision-making in the operation

5. Measure efficiency within the operation

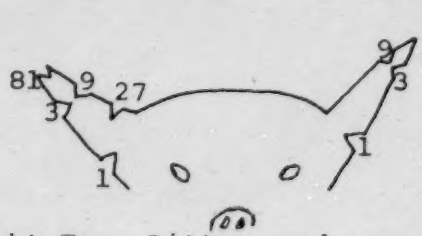
II. Records to Keep

A. The kind of records to keep will depend largely upon the needed information and the use that is is to be made of them.

B. Emphasis should generally be placed on the following records:
   1. Inventory records
   2. Breeding records
   3. Production records
   4. Feed records
   5. Pedigree records
   6. Health records
   7. Labor records
   8. Complete enterprise records

III. Record Keeping Practices

A. Identify animals within the herd.
   1. Methods of identification
      a. Ear-notching (recommended procedure)
      b. Branding (used by some producers for sow identification)
      c. Angle numbering system
   2. Recommended ear-notching system



Right Ear--Litter number
Left Ear--Pig number

Up to 161 litters can be identified with this system.

B. Weigh each pig individually at weaning age and compute litter weights to standard age.

C. Keep litter records. (See master -1.)

D. Keep records on vaccination, disease problems of individual animals and the like.

E. Use cash-flow analysis. (See master 5.)

F. Study records at end of year or production cycle, and make plans for improving efficiency.
   1. Compute measures of efficiency, such as pounds of feed per 100 pounds of gain, returns per $100 worth of feed, and cost per 100 pounds of gain.
   2. Note other accomplishments, such as average weight per pig at weaning, number pigs farrowed per litter, number of pigs raised per litter, average daily gain, and carcass cut-out value.
   3. Compare the above listed accomplishments with others and with your own previous accomplishments.
   4. Determine practices poorly applied or neglected entirely.
   5. Set new goals and formulate plans for reaching them.

G. Keep simple records of things that make a difference between profit or loss.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
   1. The role of records in properly managing a hog operation
   2. Records that pork producers need to keep
   3. Practices in keeping and using records

B. Things to be brought out by class members:
   1. The use that class members make of their records
   2. Type of records kept by enrollees
   3. Practices used by enrollees in keeping records

II. Conclusions

A. Records are needed to measure efficiency and to

make improvements in the hog operation.

B. Keep those records that are needed to furnish the information in properly analyzing the operation.

C. Follow successful record keeping practices for best results in the swine operation.

III. Enrichment Activities

A. Have enrollees analyze their operations on the basis of records kept for the past year or production cycle.

B. Guide class members into planning a record-keeping process for the year.

IV. Suggested Teaching Materials

A. References for Lesson 10

1. Farm Management, Budgets, Principles, Plans, J. H. Herbst, Chapter 11.
2. Freeze Branding--A Method of Identification for Swine, Purdue University AS-389.
3. How to Make Backfat Determinations, Purdue University AS-376.
4. National Hog Farmer, Publications A-31, A-43, A-47, A-49, C-23.
5. Swine Production, Bundy and Diggins, Chapter 13.

B. Audio-visuals

1. Masters
   - -1 Litter Record
   - -2 Adjusted 42 Day Weight Chart
   - -3 Adjusted 154 Day Weight Chart
   - -4 Adjusting Probe to a 200 Pound Basis
   - -5 Cash-Flow Budget
   - -6 Cost-Return Budget

Litter Record*

Sow name _____ Boar bred to _____

Breed _____ Date due to farrow _____ Sow No. _____

Date bred _____ Date pigs born _____

Litter Number	Farrowing			Weaning			Treatment Dates			
							Iron		Vaccination	
	Tot. No. Born	No. Born Alive	No. Born Dead	Date	No.	Tot. Litter Wt.	1st Dose	2nd Dose		
No. ____					Male Female					

Remarks:

F-555
June 1970

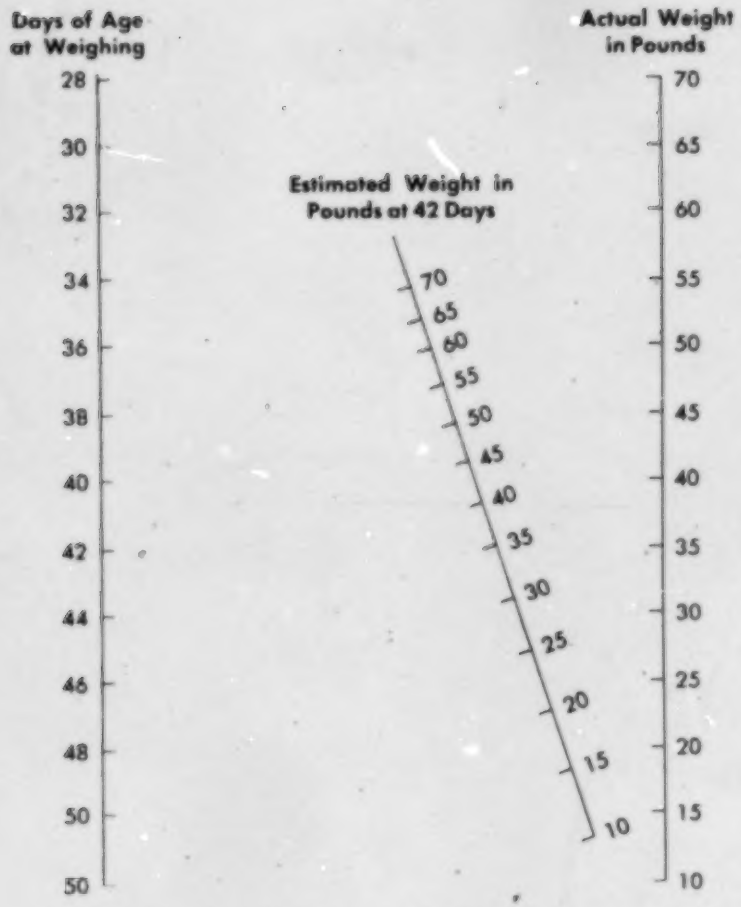
* Litter identification is adequate for the commercial producer. However, individual pig identification can also be used.

112-10-1

133

118

ADJUSTED 42-DAY WEIGHT CHART



Adjusted 42-day weight chart. Lay a ruler or any straightedge from a point on the left scale, which represents the age of the pig, to a point on the right scale, which represents the pig's weight. The intersection of this line and the center scale shows the estimated weight of the pig at 42-days of age.

SOURCE: Oklahoma State University

ADJUSTED 154-DAY WEIGHT CHART

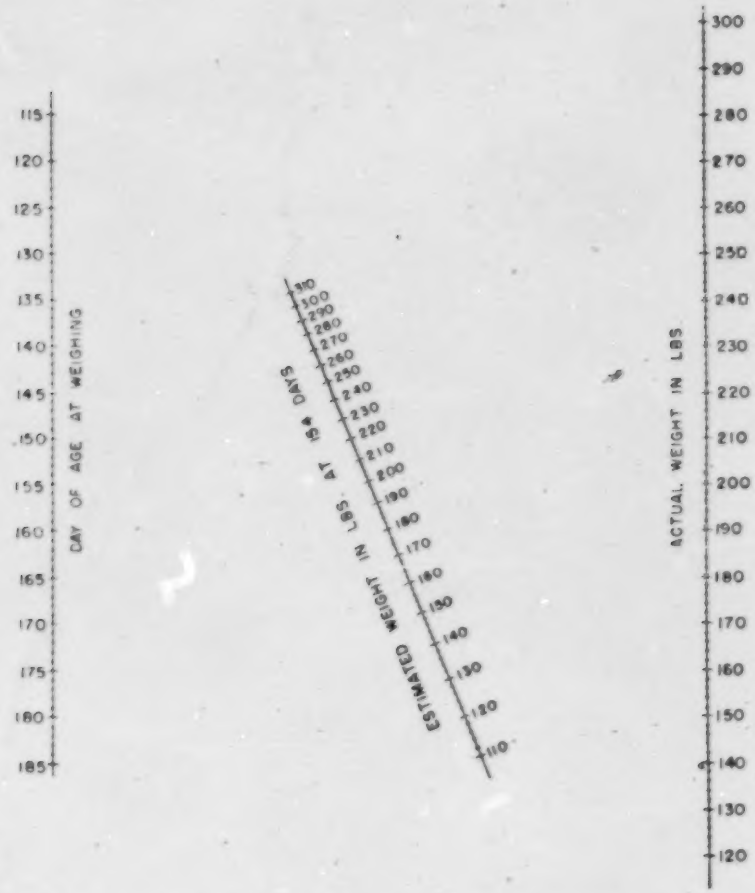
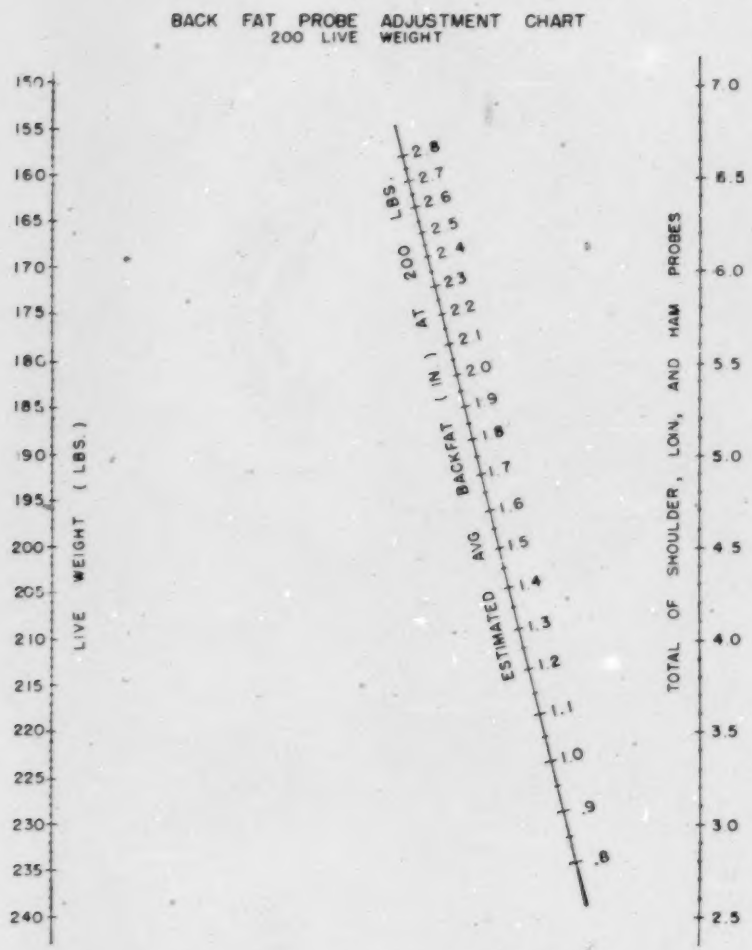


Chart for estimating weight at 154 days of age. Lay a ruler or straight edge from a point on the left scale which represents the age of pig when weighed, to a point on the right scale which represents actual weight of pig. The intersection of the line on the center scale shows the estimated weight in pounds at 154 days of age.

SOURCE: University of Nebraska

112-10-3

ADJUSTING PROBE TO A 200 POUND BASIS



Backfat probe adjustment chart, 200 pounds live weight. Lay a ruler or straightedge from a point on the left scale which represents the weight of the pig when probed, to a point on the right scale which represents the total of the three probes. The intersection of this line and the center scale shows the estimated average backfat thickness at 200 pounds.

SOURCE: University of Nebraska

112-10-4

CASH-FLOW BUDGET

ITEM	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Operating & Capital sales:												
1.												
2.												
3.												
4.												
5.												
6.												
Total												
Operating & Capital expenses:												
1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												
9.												
Total												
Budget summary:												
1. Cash balance (beginning of month)												
2. Total operating and capital sales												
3. Nonfarm income												
4. Money borrowed this year												
Total available dollars												
1. Total operating and capital expenses												
2. Family living expenses												
3. Other nonfarm expenses												
4. Payment & interest on obligations												
Total expenditures												
1. Cash balance (end of month)												

112-10-5

Cost-Return Budget: Sow and 2 Litters to Market
(4 Farrowings, Confinement)

		Your Estimate
I. Receipts:		
Market Hogs--220 lbs. X 15.5 X $21	$716.10	
Cull Sows--400 lbs. X .5 X $18	36.00	
Less sow death loss--2%	.72	
GROSS SALES	$751.28	
II. Operating Costs:		
Corn Equivalent--190 bu. X $1.10	$209.00	
Hay Equivalent--400 lbs. X $25/ton	5.00	
Supplement--2670 lbs. X $5.70 cwt.	152.19	
Creep Feed & Starter--900 lbs. X $7.15 cwt.	64.35	
Breeding charge--1 sow	6.00	
Veterinary and Medicine	10.00	
Personal Property Taxes*	10.02	
Marketing	20.00	
Building Repairs & Insurance--4% X $216	8.64	
Equipment Repairs & Insurance--4½% X $82.50	3.71	
Miscellaneous Expense--1½% of gross sales	11.27	
TOTAL DIRECT COSTS	$500.18	
III. Income Over Direct Costs:	$251.10	
IV. Depreciation:		
Buildings--10% of $432 = 43.20		
Equipment--12% of $165 = 19.80	63.00	
V. Interest on Investment:--$597 X 50% X 8%	23.88	
VI. Labor (Operator & Hired) 32 hrs/sow/yr @ $2/hr	64.00	
TOTAL COSTS (Total direct cost plus IV, V, & VI)	$651.06	
VII. Net Income per Sow per Year	$100.22	

*Taxes on livestock, buildings, and equipment figured at 60 mills

Source: Kansas State University, Circular 388

112-10-6

APPENDIX

MY TEACHING PLAN FOR THIS COURSE

Why I am teaching this course (major learnings or outcomes expected)

ARRANGEMENTS FOR THE COURSE

Session No.	Date	Topic	Clock Hours

This page is for your convenience in planning and rearranging the content of this course to meet local needs and interests. Plan the course as it will be taught in the local school, showing the dates, class session number, topics, and the time in hours allocated to each topic.

TOPIC PLANNING FOR THIS COURSE

Name of Course _____

Name of Topic _____

Number of Class Meetings Allotted for this Topic _____

Teaching Objectives: (Learnings or outcomes for those enrolled)

Major Phases of the Topic: (Problems, jobs, areas, skills, key points, understandings, etc.)

Learning Activities: (Field trips, completing summary forms, panel discussions, demonstrations, etc.)

Teaching Materials Needed: (From resource material list or file)

RESOURCE MATERIALS FOR TEACHING

Unit _____ Lesson _____

Reference Books	Date Used	File Location

Other References: Bulletins, Magazines, Etc.

Audio-Visuals: Slides, Filmstrips, Motion Pictures

Magnetic, Flannel, and Bulletin Boards

Charts, Maps, Posters

Transparencies

Specimens, Models, Mounts

Human and Community Resources

Please complete and return to:
Maynard J. Iverson
7 Dickey Hall
University of Kentucky
Lexington, Kentucky 40506

ADULT INSTRUCTIONAL UNIT EVALUATION

-- A Questionnaire for Kentucky VoAg Teachers of Adults

PART I -- GENERAL INFORMATION

How many years of teaching experience do you have? _____

How many years have you taught adults in agriculture? _____

How long has it been since you have taken your last college classwork in agriculture_____; in education _____; (undergraduate, graduate, or non-credit course)? _____

What is the highest degree you hold? _____

How many teachers are in your department?_____

What age level students do you teach? (✓ one)
a) ____high school and adult b)_____adult only

How many other units from the University of Kentucky have you used in your teaching during the past few years?_____

PART II -- UNIT INFORMATION

NAME OF UNIT EVALUATED:_____

TYPE OF CLIENTELE TAUGHT: _____Adult Farmer _____Young Farmer
_____Other Adults (please specify)_____

Average number attending class _____

Was the interest level _____high? _____moderate? _____low?

How many lessons did you use?_____ How many class periods?_____

Indicate any lesson you added or deleted_____

_____

_____

_____

Directions: Place a check mark (✓) in the appropriate left hand column to rate the following components of the unit based on your own observations. A ranking of 5 represents an excellent rating decreasing to a rank of 1 for poor. For the open-ended questions please write on the back if additional space is needed.

Unit Design

5	4	3	2	1	
					General arrangement of parts
					Appropriateness of format for teaching adults
					Length of the unit
					Usefulness of suggestions for using the unit
					Number of lessons
					Order of lessons

Specific comments:_____

_____

PLEASE CONTINUE ON NEXT PAGE

Objectives in the Unit

5 4 3 2 1

Clearly stated
Reasonable to reach in the allotted time
Relevant to needs of the adult learner
Specific comments: _____

_____

Technical Content

5 4 3 2 1

Usefulness of introductory material
Sufficiently detailed for direct use in class
Related to objectives
Divided into appropriate problem areas
Up-to-date
Accuracy
Reasonably complete
Specific comments: _____

_____

Suggestions for Teaching the Lessons

5 4 3 2 1

Appropriate information for the teacher to bring out
Appropriate items to be secured from class members
Suitable conclusions
Suitability of enrichment activities
Specific comments: _____

_____

Resources and Teaching Aids in the Unit

5 4 3 2 1

Up-to-date
Accessibility to the teacher
Relevance to the unit
Adaptability to the teaching plan
Specific comments: _____

_____

With what parts of the unit do you feel you need additional help?

____None of them
____Objectives
____Content
____Course organization and planning
____References
____Resources and teaching materials
____Teaching methods
____Other (Specify) _____

PART III -- GENERAL REACTION

Please indicate any other strengths and weaknesses that you have observed in the unit and any suggestions for improvement, revision, and/or implementation (use the back of this sheet if needed).